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INFLUENCE OF GEOGRAPHICAL CONDITIONS UPON JAPANESE AGRICULTURE.*

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Islands have in all times proved to be desirable habitats. They offer a milder and generally a better climate than the continental lands in the same zonal location. They confer upon a young or weak people the great boon of protection and often of independence, enabling it to work out its political or cultural salvation in its own way. To a growing people they give the double larder of land and sea, crops and fisheries, and the added opportunity of increasing the national income by international trade. In them isolation and accessibility, protection and intercourse, are found in their best combination.

Islands present, therefore, admirable conditions for early development of civilization. Population tends to concentrate in these favoured spots. Then it increases and develops under the stimulating, strongly interactive life of a confined area. Civilization, protected from outside attack, but reinforced by outside contributions, experiences a rapid evolution. But rarely do islands originate their elements of civilization. For that their area is too small. But whatever seed of culture ripens in the wide fields of the continents island people transplant to their own forcing-houses; there they so transform and perfect the flower that it appears to be an indigenous product. Japan borrowed freely from China and Korea, as Britain did from continental Europe; but these two island realms have brought Asiatic and European civilization to their highest stage of development.

Geographical conditions in islands first of all apply the spur to agriculture. Tillage begins early to assume an intensive, scientific character

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in order to feed an increasing population from a land area that cannot be increased. In the great island world of Oceanica, agriculture of an advanced type is everywhere indigenous. The overpopulated atolls of the Gilbert group, for instance, show painstaking tillage. Here we find coco-palms with their roots fertilized with powdered pumice, and taro cultivated in trenches excavated for the purpose and located near the lagoons, so that the water may percolate through the coral sand to the thirsty roots. The Melanesian islands show fenced fields, terrace-farming on mountain sides, irrigation canals, fertilized soils, well-trimmed trees, and beautiful flower-gardens—proof that the cultivation of the ground has advanced to the æsthetic stage as it has in insular Japan. But it is in Fiji that native island agriculture seems to culminate. Here a race of dark-skinned, frizzly-haired savages, addicted to cannibalism, have in the art of tillage taken a spurt forward in civilization, till in this respect they stand abreast of the average European peasant. The German asparagus-bed is hardly cultivated more carefully than the yam plants in Fiji; these also are grown in mounds made of soil that has previously been pulverized by hand. The variety and excellence of their vegetable products are amazing, and find their reflection in an elaborate national cuisine, strangely at variance with the otherwise savage life.

The inelastic, sea-drawn boundaries of the Japan archipelago have resulted here also in a precocious development of agriculture, with its natural accompaniment of a dense population. These twin phenomena tend to appear in all islands of favourable location, where climate and soil permit cultivation. The land, fixed in the amount of its area, must be made elastic by the application of industry and intelligence, to supply the increasing demand for food. When to small area are added a rugged mountainous relief, scant alluvial valleys, narrow coastal plains, and a geological history making for poor infertile soils, still more insistently does the pressure of population apply the goad to agriculture.

Such have been the conditions and results in Japan. Here agriculture has attained an economic, æsthetic, and national importance attained nowhere else. Of the 147,655 square miles constituting Japan proper, two-thirds are mountains. Large tracts of the lowland hem of the islands are useless rock wastes, owing to the detritus brought down by inundating mountain torrents during the rainy season. The rivers have so short a lower course that they cannot form extensive alluvial valleys of fertile silt; they deposit chiefly gravel and sand, transported by their swift mountain-born currents, whereby they constantly raise their beds. These elevated channels aid the peasants by furnishing natural reservoirs for the irrigation of their ricefields, but they also increase the danger and occurrence of widespread inundations; hence the extension of the disastrous gravel deposits, and the difficulty of draining the swamped fields. The view from the summit of Fujiyama in August, 1911, commanded a wide stretch of such inundated lowlands due to the floods of the Fujikawa river.

Owing to the mountainous character of the islands, the plains are of limited extent, distributed along the seaboard or the lower course of the larger rivers. On the Inland Sea, apart from the Osaka lowland, coastal plains are rare, except occasionally where dykes have reclaimed from the sea little patches of deposit land at the mouth of small streams. But the tendency of the typhoons immensely to increase the volume of the rivers during the summer rains presents a serious obstacle to reclamation.

Such plains as exist are used extensively for agriculture. The extent of the tillage area in each district depends chiefly upon relief and climate, much less upon the quality of the soil. The composition of the soil influences the choice of crops planted and the degree of productivity. The mountainous relief of the country and its location in the monsoon belt of heavy rainfall cause the islands to be covered with a close network of streams and brooks. This wealth of small watercourses available for irrigation, in combination with the mild climate, make favourable conditions for the cultivation of rice. This, during the two hundred and fifty years of seclusion and since, has been the chief food crop. The average Japanese farmer therefore regards all land from the standpoint of suitability for rice culture. Hence the traveller in Japan is struck by the close adherence of the tilled area to the borders of rivers and streams. Even in narrow mountain valleys and gorges, where water is available all year round, the valley bed is laid out in terraces nearly to the source of the river. Here one terrace may rise 2 yards above the lower one, but is perhaps only 1 or 2 yards wide on top, while extensive land inaccessible to the irrigating water is left untouched and unsettled. A study of a large-scale relief map of any section of Japan, as the Kotsuke sheet, shows hamlets and villages crowding close to the main streams or their tributaries, but thinning rapidly in the interfluvial spaces where the contour-lines begin to contract.

Geographical conditions of climate and relief have given a peculiar character to the cultivation and settlement of the country, and hence to its political development. A 200-mile tramp into the central highland of Japan revealed the fact that cultivation and settlements were extremely rare above 2300 feet elevation. Above this level were found only the occasional hut of a charcoal burner, or the temporary shelter of fishermen exploiting in the summer the life of the mountain lakes. The highlands rise everywhere as empty, forested barriers, holding apart from each other the valleys on each flank. Hence Japan has been characterized by the maintenance of countless segregated communities even to recent times.

The effective area of Japan for purposes of subsistence is further limited by the infertile character of the soils. The volcanic nature of the land has been a disadvantage, because the widespread ash rains from the late Quaternary period to the present have ruined other relatively good soils with which they have mingled. There are three groups of volcanic soils: (1) Ash, poor in itself and disastrous as an ingredient. (2) Trachytes,

which disintegrate into poor or mediocre soil. (3) Lavas, basalts, and andesite tufa, which belong often to the best in the islands. The weathered lava especially is more fruitful than the other two, contains more soluble potash and phosphoric acid. It is richer in plant food than the granitic soils, and in its capacity for absorbing fertilizers. The ash is quite lacking in phosphoric acid, and is bad in its physical make-up. When dry it is like sand, and when wet it packs down into an amorphous clay-like mass.

Granite soils are found south of the latitude of Tokyo and west of the meridian of Fujiyama, covering a large area. They contain only a small amount of available plant food, and yet they belong to the most productive in the island. This is due to their favourable mechanical composition, their porosity, and their capacity for absorbing fertilizers. Practical observation shows these granite soils to be in many regions the best for rice, tea, cotton, sugar-cane, and hemp. The famous Uji tea plantations near Kyoto are located on this kind of soil. The granite mountains give an impression of glacial moraine hills owing to their rounded form, and steep slopes dropping suddenly to the plains, and their thick crust of granite boulders and sand, the product of the energetic weathering induced by Japan's climate. But the steepness of the slopes often curtails to a considerable extent the utilization of these weathered mountains for tillage.

All these disadvantages of relief and soil explain the fact that to-day arable land forms only 14·37 per cent. of the total area of Japan proper. Ten years ago it formed 13·7 per cent.; in 1887 it was 11·8 per cent.; so the extension of the arable area proceeds slowly, despite progress of science and pressure of population. Though handicapped by this scant tillage area, Japan supports a population of 350 to the square mile. This density nearly equals that of the United Kingdom (373 to the square mile), surpasses that of Italy (314 to the square mile), though Italy has 49 per cent. of her area fit for agriculture; and it is nearly double that of fertile and thrifty France, with 55 per cent. in tillage. Greece, which in its 18·4 per cent. of arable area shows a proportion comparable to that of Japan, has a density of population only one-third as great. Switzerland's density is only two-thirds that of Japan, but this mountain country has the scant 16·1 per cent. of its area which is fit for tillage reinforced by the 36 per cent. used for hay meadows and highland pastures. This advantage is, however, counterbalanced by Japan's maritime location and abundant fisheries—those pastures of the sea. According to Hübner's statistical tables, only Finland, Sweden, and Norway show a smaller percentage of tillable land; but they also show the sparsest population in Europe. The Scandinavian states have also extensive mountain pastures for cattle and goats.

Japan faces the problem of reclaiming for tillage some part of that 85 per cent. of its area which now remains as forest (59 per cent.) or waste land. Experts calculate that, if land inclined less than 15 degrees

admits of being utilized for agriculture, then about 30 per cent. of these gentler slopes represent the possible margin of reclamation in old Japan, as 70 per cent. of them are already under the plough. But whether the work of reclamation is physically or economically possible is another question. The moors, which form a large part of this hypothetical 30 per cent., are volcanic ash in central Hondo, and hence untillable, no matter how gentle their slope. Other portions are covered with rock detritus or are constantly exposed to disastrous overflow, rendering the work of reclamation impossible. Reforesting the headwater area of certain rivers, however, has proved effective in reducing their floods to controllable limits. Moreover, the preparation of waste lands requires several years of labour unrepaid or a large outlay of capital, both of them prohibitive alternatives for the poor Japanese farmer. Hence the opening up of large tracts of wild land has been conducted only by rich individuals or companies, who then offer special inducements for the settlement of farmers. The rate of increase of tillage area in the three chief islands (excepting the Hokkaido) is 0·5 per cent. as opposed to 0·8 per cent. in Germany and Italy. The area reclaimed in the past twenty years for paddy-fields is slightly larger than that for upland farms, where dry tillage is practised. However, Japanese agriculture must look for its best development in the extension of the diversified crops that can be raised in the higher reliefs, where rice culture is excluded by inaccessibility to irrigating streams.

Japan shares with other islands of favourable zonal location the tendency to pack away a large population in a relatively small area. This tendency became an exaggerated fact when, by the policy of exclusion adopted in 1624 and maintained for two hundred and fifty years, all emigration and foreign trade were forbidden. By the more obvious laws of geographical probability, seventeenth-century Japan, like ancient Crete and modern England, should have maintained an active maritime trade with her neighbours and with the European merchantmen visiting her ports. Her small area, limited food-supply, the possibilities of her tea and silk trade should have forced her into commerce as a means to feed her growing population, especially since in previous centuries she had reaped the benefit of an extensive Asiatic trade reaching as far as India, and had moreover developed the merchant marine wherewith to conduct it. This was the immediate result of her maritime accessibility, favoured by her insular location close to Asia on the margin of a thalassic basin, of her indented shore-line, her well-populated coasts, and her sea-bred nautical efficiency. But in 1624, Jesuit intrigue to overthrow the government, and possibly to hand it over to Catholic Portuguese rule, threatened Japan's political integrity and gave sudden alarm to that jealousy of outside interference, that ineradicable instinct for aloofness which had been bred in the people by their island habitat, and which remained intact in 1624 after centuries of maritime intercourse. Japan adopted and maintained for so long this policy of seclusion because her insular location

both suggested and made it possible. She abandoned it when her small sea-bound area had protected her nascent civilization till its character was formed, and when keen internal competition, unrelieved by any outlet, had trained the national forces in the adaptation of economic means to economic ends. Then her national integrity could be better secured by expansion than by relying upon her primitive geographical defence.

During the long period of seclusion, a large and growing population had to be nourished from a small area, further restricted in its feeding capacity by the character of the relief and the soil. According to the rather unreliable data to be had, the population, which was about 5,000,000 in 610 A.D., had risen to 8,631,000 in 736. We have no figures for the eventful year of the Seclusion Act (1624), but in 1723 a careful census, taken as a police measure, returned the number of the inhabitants as 26,065,422; and another in 1846 gave them as 26,907,625. In this interval of 123 years, therefore, population was practically stationary; as a matter of fact, it had had five short periods of decline. This means that under the conditions of rigid seclusion Japan's area in relation to its population had reached the saturation point. The land could hold no more.

Now, what about agriculture? It shows all the influences of a small, naturally defined area working themselves out to their logical conclusion. Its whole development, with the attendant economic and social results, has the definiteness and finish of a laboratory experiment. Tillage progressed rapidly, and gave the farmer a rank in the social scale such as he attained nowhere else. His methods of agriculture are similar to those of over-crowded China, but his national importance and hence his ranking in society are far higher. Though ignorant of the scientific reasons, he has worked out a system of tillage that is wonderfully effective. He has succeeded in making a naturally infertile soil highly productive by intensive labour, by deep-down cultivation, constant weeding, abundant watering of crops either from rainfall or irrigation streams, and especially by repeated manuring during the development of the crop itself, which is possible only where planting in rows is the rule. He is materially aided by a long humid summer free from chill or frost, by an abundant rainfall, and a relief favourable to irrigation, which brings not only water but plant food to the growing crops. By these means he secures a net profit on his tillage, despite the limited rotation of crops which he practises.

Japanese agriculture is distinguished by two marked characteristics, with which is closely associated a third, more striking and hardly less important. These are, first the small arable area, which necessitates the constant use of the land and hence precludes fallow fields; and second, the dominant cultivation of rice with scant rotation of crops, due to climate, relief, and the obstinate conservatism of the national palate. These two features combine to create a big demand for fertilizers, in order to prevent exhaustion of the soil. And here we meet the third distinctive characteristic of Japanese agriculture, the practical absence of stock-raising. In

AN ÆSTHETIC PHASE OF JAPANESE AGRICULTURE. PEASANT'S FARM AT 2200 FEET.

A MOUNTAIN VALLEY IN PADDY-FIELDS AT 1750 FEET.

TIMBER ROOF AND WEIGHT ROCKS NEAR THE UPLAND LIMIT OF AGRICULTURE, BARLEY DRYING UNDER EAVES.

TERRACED VALLEY, RICEFIELDS ABOVE OHARA. 2000 FEET.

SUMMER VILLAGE OF YUMOTO AT 5100 FEET ABOVE THE LIMIT OF CULTIVATION.
TIMBER ROOFS SUPPLANT THATCH.

all other countries this is the necessary auxiliary of tillage, because it furnishes manures. Japan, which most needs fertilizers, lacks this most valuable and economical source of supply. The highlands, which comprise two-thirds of its territory, fail to show the big herds of cattle, sheep, and goats grazing on upland pastures, which add a charm to every mountain landscape in Switzerland and Norway. This appropriate industry of high altitudes has developed in all other parts of the two hemispheres, from ancient Peru with its llama and vicuna herds at 12,000 feet in the Andes to the modern sheep ranches in the Rockies of Idaho. Only economical, ingenious, poorly fed Japan has none.

The explanation of this anomaly has often been sought in Buddhism, which forbids the taking of life and therefore inhibits the use of animal food; but the economic mind is led to suspect that the religious rule found ready acceptance in Japan, just because the lack of animal food made its observance easy. It is significant from the geographical standpoint that fish diet was never put under the ban, and that the deer everywhere nipping the young shoots in the widespread forests had as much difficulty in saving their venison in Japan as here in England. The reason for the meatless diet is to be sought elsewhere. It is probably found in the lack of any wild fodder plants or natural pasturage for herds in Japan, and in the presence of the native bamboo grass; this is not only innutritious, but it relentlessly crowds out all imported grazing crops. Prince Field-Marshal Oyama, who has turned Cincinnatus since the Russian war, has been trying to raise sheep and fodder grasses on his farm in the mountains of central Hondo; but he finds the experiment almost as expensive as the Manchurian campaign. Mr. Takashi Masuda, the general manager of the celebrated Mitsui estate, has been trying for the past five years to get clover to grow on one field in his Hakone mountain farm. He is now beginning to think that he has promise of a crop; but he does not hope that the debit and credit account of that crop will show a profit.

The lack of pasturage and the consequently very small number of cattle and stock in Japan, therefore, compel the farmer to seek his fertilizers in other sources and to conserve them with the utmost economy. The dense population of the islands make night-soil or human manure the most obvious and abundant substitute, and on this Japanese agriculture chiefly relies, as it has so relied for centuries. Long before European chemists discovered in it the high percentage of nitrogen, phosphoric acid, and potash, which make it a valuable addition to any soil, the empirical farmers of China and Japan considered it superior to all other manures. By experience they have learned to treat it in the way to get the best results, and to apply it to the soil at the moment when the constituent elements are chemically most available for plant food, and before the compounds have lost ammonia by excessive decomposition. Hence their practice long ago anticipated the laboratory results of European scientific theory. With no other instruction than that of century-long experience

and ignorant of scientific reasons, they display greater understanding in the choice and application of manures than the average European peasant.

Horse manure, which is scant and inferior in quality owing to the poor feed of the animals, is carefully husbanded in the stables and gathered on the streets and roads with shovel and basket; but in the mountains, where both horses and cattle are more relied upon for transportation, this manure rises in importance. But the Japanese find superior alternatives in fish guano and the refuse of their own abundant fish diet, in ashes of wood and straw, bone-ash and bone-dust imported from Australia, oil cake, and the refuse from the widespread sericulture, which contains rich nitrogenous elements in the boiled larvas, dead worms, worm excrements, and the half-eaten mulberry leaves. Latterly chemical fertilizers, based largely upon phosphate rock imported from the South Sea islands, have been introduced, and have come widely into use; but the Government exercises a strict control over their sale, in order to prevent adulterations. The farmers make also various kinds of composts, into which enters every kind of organic matter, from rice-bran to dead leaves and the sweepings from the floor of the barber-shop. Liquid fertilizers are always diluted with the water from the family bath tub and dish-pan. Green fertilizers, in the form of twigs from the forests and grasses cut from the moors or waste lands, are widely used. Thus the arable land is enriched at the cost of the non-arable. But no fertilizing crops are raised and then ploughed in, with the possible exception of beans. The small amount of the tillable land forbids this method, as also the slow weathering process of enriching a fallow field.

Japanese agriculture has also a distinctive method of fertilizing. It is applied to all crops without distinction, even on freshly broken virgin soil, and to each individual plant of the crop, with the exception of rice. Manure is not applied all at once. The chief portion is placed in the ground with the seed, and the remainder at two to four successive periods during the time of growth. The object is economy and effectiveness. Manures are there never applied to a fallow field, where they can either dry up or be robbed by the torrential rains of their most valuable constituent elements. Climatic conditions in Japan make for very rapid decomposition and deoxidation of all organic matter, and the heavy rains carry the plant-food deep into the ground beyond the reach of the roots. Waste like this Japanese agriculture could not bear. So at intervals the farmer pours his weak liquid manure from a long-handled dipper upon each separate plant; this is "head fertilizing," or *Kopfdüngung*, whereby not the field but the plant itself is fed. Thus the next harvest is increased, though the field gains nothing for future crops. The Japanese farmer has pursued this method for centuries, and in this way he maintains a fair annual balance between exhaustion and restitution, the debit and credit account of the soil.

The Japanese are to a predominant degree vegetarian, except for the excellent and abundant fish-food brought to their shores by the cold sub-polar currents. The long-drawn zonal location of the islands, extending from 21° 45′ to 50° 53′ N. lat., makes the fisheries accessible to a majority of the population, and provides a great variety in the catch from tropical to arctic kinds. But aside from fish, the food of the Japanese consists mainly of cereals, vegetables, and latterly fruits. It is quite probable that the initial lack of pastures and fodder-grasses excluded meat from their dietary, and that later this received a religious prohibition, upon the introduction of Buddhism.

Whatever the cause, this vegetarian taste has given to Japanese agriculture a very one-sided development. Rice became the staple article of production and food, highly favoured as it was by the mild climate and the warm, rain-bearing winds from the Kuro Siwo. It was inevitably supplemented by a great variety of vegetables and especially leguminous plants that would supply the nitrogenous elements ordinarily consumed in a meat diet. Cattle and horses were largely dispensed with in their agriculture, both because the small size of the fields and their terrace-form scarcely admitted the employment of animals, and especially because the super-abundance of human labour inevitably gave agriculture a development in which this could best be utilized. Intensive rice-culture can employ an immense amount of labour. The net profits of a rice crop represent in no small degree the normal wages of the farmer and his family for a long season of work. Though horses and cattle are frequently employed in ploughing and harrowing the paddy-fields, labour is chiefly manual. Mattock, hoe, and the human hand itself are the most common tools. Men and women carry in the harvest on their backs.

It is claimed that 4000 varieties of rice are raised in Japan. The most important distinction is that between swamp rice and upland rice. The latter needs little water, can do without irrigation, though it requires much atmospheric moisture, ripens in a cooler climate, and so is confined to the mountains and to the northern rim of the swamp-rice area. Here lies its possible area of extension; for little is grown now, only 1·6 per cent. of the total rice crop in Japan. It yields in general a smaller net return than paddy rice, probably owing to careless tillage, for in certain provinces where it receives more attention the yield is considerable.

Swamp-rice culture entails constant labour for a long period of time. The paddy-fields are rarely without the bending figure of the labourer. The work on the crop in autumn begins with the ploughing of the seed bed, which early the following spring is broken up again and manured. Then it is irrigated, its mud mixed, its clods crushed by hand, to be drained again and dried thoroughly in the sun. Again the water is turned in, and the seed bed is ready for the sowing, which takes place between the middle of April and the middle of May, according to the climate. For two months these beds are carefully tended, while the ricefields themselves in

turn are undergoing successive ploughings, fertilizings, and irrigatings. About the middle of June, on an average, they receive the young rice plants. Thirteen days after the transplanting, the working and weeding of the paddy-fields begin. This process is performed by hand, and is repeated each week, four to seven times altogether. Meanwhile the amount of water in the paddy-field is carefully regulated. More or less is admitted according as the weather is warm or cool, dry or humid, in order to maintain a certain temperature around the plants. The water, when drawn from cold artesian wells, is turned into shallow surface ponds for several days to warm in the hot summer sun, so that it may not chill the growing plants. The harvest is gathered during September or October according to the climate. Hence the working season in the paddy-fields lasts seven or eight months.

The tillage land in Japan falls into two classes, wet and dry fields, or *Ta* and *Hata*, in the native tongue. Paddy-fields in 1908 comprised 52·2 per cent. of the total arable area, and upland or dry fields 47·8 per cent. But 1·6 per cent. of the total rice of the country was the upland variety, raised on dry fields; and bearded barley, naked barley, and wheat, while constituting staple crops in upland farms, are also extensively cultivated as a second crop after rice in such paddy-fields as can be drained. Millets are raised extensively in the highlands where paddy-fields are scarce, and are substituted on paddy-fields in bad years when the rice-planting season has passed, owing to some adverse condition, without the regular crop getting put in. So that the wet fields must not be regarded as restricted to one kind of culture.

The relief of a province determines largely the distribution of the farms in wet and dry fields. Owari province, comprising a low plain at the head of Owari gulf with a large tillable area, had, in 1885, about 31 per cent. of its total surface in paddy-land, and 18 per cent. in dry culture. In contrast, Shimotsuke province, a poor highland region of volcanic formation, has about 17½ per cent. of its total surface under cultivation; of this 8 per cent. is in paddy, and 9½ per cent. in dry fields. Kotsuke province, occupying the great mountain centre of Hondo, its surface consisting of archaic rocks and volcanic detritus, has only 16 per cent. of its total area in tillage. The scant 5 per cent. constituting its rice lands are found in the narrow valleys of its drainage streams, while 11 per cent. of its surface is devoted to dry farming.

These two kinds of tillage are distinguished not only by their contrasted geographical distribution in mountains and plains, but also in the kind of labour used. About 66 per cent. of the total area of upland farms are cultivated exclusively by human hand. On 64 per cent. of the paddy-fields horses and cattle are used, though only to a limited extent. They are employed chiefly for ploughing, harrowing, and carrying home the harvest. Though the upland fields are on an average twice the size of the lowland fields, and hence in point of area are better suited to the use of animals, the method of tillage on the dry farms, as will be shown,

RICEFIELDS WITH BOUNDARY RIDGES PLANTED IN BEANS. BARLEY DRYING UNDER EAVES OF THE HOUSE. 2200 FEET, KOTSUKE.

INTERCULTURE OF BARLEY AND BEANS AT 2000 FEET.

INTERCULTURE OF MULBERRY TREES, DRYING BARLEY AND MILLET. 2200 FEET.

MULBERRY TREES AND MILLET. 2000 FEET, KOTSUKE.

PACK TRAIN PASSING THROUGH A MOUNTAIN VILLAGE.

admits only of hand labour. Such stock as the mountain farmers own are used in the urgent service of transportation; for the paucity of draft animals in Japan has restricted waggon-roads to the main thoroughfares, so that the mountain trails admit only pack-animals or coolie bearers.

Terrace agriculture in other parts of the world is practically restricted to mountain regions, because there alone it is necessary to resort to this difficult device for supplementing the scant level area. In Japan it is widespread in the lowlands. This is due to the predominance of rice culture, and the accompanying system of irrigation which it entails. The flow of water from one paddy-field to another necessitates successive levels, so that even the gentlest slopes are terraced, though the difference of elevation is usually slight. However, when rice culture pushes up a river valley to its source in the mountains, the retaining walls may be 4 to 6 feet high, while the fields between may be mere strips only 2 or 3 yards broad. Terrace culture up very steep slopes for dry crops is not extensively practised in Japan, except when the composition of the soil is distinctively favourable. When weathered basalt and trachyte rock, like that near Nagasaki, make a fertile soil, the construction and cultivation of the terraces pays. So it does on the granitic hills about Lake Biwa and the hills south of Nara towards Koyasan, where the tea bushes find a congenial soil; but not in the volcanic mountains of central Hondo, where the poor soil yields too scant a harvest. Along the steep shores of the Inland Sea, however, the closely strewn fishing villages make an insistent demand upon the land; and here terraces are plentifully interspersed among the forests, and frequently rise to the summit of the hills.

The facts that strike the traveller in Japan are the practical cessation of tillage at an altitude of 2300 feet or less, and the marked predominance in all upland or dry farms of "interculture," or *Zwischenbau*, as the Germans call it. This consists in raising alternate rows of different crops in the same field, planting one earlier than the other, so that it matures and can be harvested first. It constitutes a sort of simultaneous rotation. The combinations are varied, but usually include some kind of leguminous plant with a cereal. The advantage lies obviously in the nitrate-gathering power of the former. Beans and barley are almost always so planted together, as are beans and millet. These combinations are often set out in the wide spaces between rows of mulberry trees. The barley ripens first, and then is hung up to dry on the half-picked boughs of the trees or on rods stretched under the eaves of the farmhouses; for here, as in other rainy lands, special provision must be made for keeping the harvest dry.

The combinations in this interculture are numerous. Mulberry saplings, a permanent crop, are set out in alternate rows with annual maize, onions, or satoimo (*Colocasia antiquorum*), whose thick fleshy roots are a favourite article of food with the peasants. Beans are combined with carrots, millet, maize, and daikon, a variety of giant white radish,

universally eaten by the Japanese. Tea bushes may alternate with another permanent crop like mulberry, or an annual like satoimo.

This interculture is possible only in hand tillage such as the Japanese excel in; it excludes all animal work and agricultural machinery in sowing or harvesting, and prohibits the use of the best tools, such as the scythe for harvesting grain, which must be cut by the sickle. But while it thus exacts a wasteful application of labour, which, however, is abundant in Japan, it permits a very intensive utilization of the soil and an even distribution of labour through a long period of the year. These are important considerations in a country where arable land is scarce and labour abundant. The use of a given area is highly economical by this method. Interculture requires more space between the rows of the chief or older crop, but not double space, because the second or younger crop does not need so much room in its youth as later; and this the harvesting of its comrade crop allows it later in its maturity. It permits a close dovetailing rotation of crops, in point of time, space, and labour. By this method three or even four harvests may be gathered from one field in one year. In the chief indigo district of the southern island of Shikoku, interculture permits four crops—grain, then indigo, then soy-beans and finally daikon, to be raised on the same field in one year. The work of setting out the young crop falls in the lull of cultivation preceding the harvest of the older crop, but redounds to the benefit of the latter by loosening the soil between the rows and keeping down the weeds.

The same object of economy of space and dovetailing of labour is accomplished by the sericulture of Japan. Mulberry trees or saplings are set out in alternate rows with other crops, or in the borders of the regular fields. Their shade does not appreciably interfere with the growth of the other plants, because they are kept almost constantly stripped of their leaves. These are picked and carried into the house to feed the silkworms, which are reared regularly every spring and autumn, and occasionally also in the intermediate summer season. Sericulture forms the most profitable subsidiary occupation which the Japanese can have. Without it small farmers, and especially tenant cultivators, would hardly be able to maintain themselves, so narrow is their margin of profit. Therefore we find that in 1908 sericulture was carried on in one-sixth of all the households in Japan. This means that the women and children are equally employed with the men, so all the labour force of the family is used. The period of labour is stretched out, since the reeling can be done at any time, and since rearing the worms is now, by recent progress, distributed through half the year. In this way, the peasant can double the profits from ordinary farming alone. Moreover, he has no unusual competition to fear, because experience shows that sericulture is essentially a household industry, for it has rarely succeeded when conducted on a large scale.

Its value to the farmer becomes still more apparent when we notice its geographical distribution. It is peculiarly the helpmate of the hard-driven

small peasant of the upland farm, and it is to a considerable degree a product of its environment. It is found almost exclusively in inland provinces, which, by reason of remoteness and a rugged surface, command poor means of communication; hence they have been compelled to bring forth a product of small bulk and large value, able to stand the heavy transportation charges necessary to get it to market. Kotsuke, the chief silk district, is typical. It occupies the heart of the great central mountain mass of Hondo, northwest of Tokyo, and has only sixteen per cent. of its total area under tillage; yet despite its rough mountainous character and its volcanic soil, it is an important district of production, owing to its silk culture. In 1887 it produced one-fifth of the whole output of Japan, and in 1908 had 44,181 families engaged in sericulture.

We tramped through the heart of this province in July of 1911, entering by way of the Konsei pass (6663 feet elevation) from Lake Chuzenji and Yumoto. From the summit of the encircling range, a trail, half ash path and half stream, guided us down through a dense, rain-soaked forest which grew in a loose soil of volcanic detritus mantling the slope of the volcano of Shirane-san (7500 feet elevation). No sign of habitation broke the green solitude, except one deserted bough-built shelter of some last winter's sportsman, till we reached the village of Higashi Ogawa at 2300 feet elevation. Here the little stream of Ogawa, leaving its upland course across a belt of quartz porphyry and diorite, and issuing upon a gentler slope, began to deposit its scant store of silt and to form a tape-like strip of poor alluvium. From this point, all the 18 miles down the Katashina valley to the town of Numata, silk culture dominated the economic life of the closely strewn villages. Mulberry trees and saplings edged the few paddy-fields or were interspersed among the dry fields. In the open houses women and children were picking over and assorting the cocoons, trays of which were spread out on the ground or were being packed into great wicker crates, to be transported on horse or peasant back down to the reel mills at Shibukawa. In front of every house sat a woman with a hand reel, reeling off the silk filaments from the cocoons, which bobbed about in the pot of boiling water on the hibachi before her.

The same scenes are to be witnessed in Kai Province (Yamanashi district), where 12,422 families eke out by sericulture the poor existence afforded by a rugged relief and a sterile volcanic soil. Especially is this true in the eastern section on the northern slope of Fujiyama, along the line of lakes formed where lava-flows have dammed up the drainage streams. Here, at an altitude of 3000 feet, mulberry trees are almost the only crop, while picking the leaves, feeding the worms, and assorting the cocoons constitute the main occupation of the women. In addition to the mulberry plantations, one sees only meagre bits of interculture, or an occasional line of terraces planted in beans and maize, laid out in small patches among the forests covering the steep mountain-sides.

The intensive culture, small arable area, and dense population in Japan

have combined to produce exceedingly small land holdings. Dwarf-farming prevails. One hectar, or 2½ acres, is the average farm per family. In 1908, a little over sixty per cent. of the population lived by farming; of these over half tilled fields of less than 2 acres, while only one per cent. of the farmers held more than 12 acres. Thus the contrast between the large farmer and the small one is not so striking as in many countries. Here we have a prevailing system of pulverized estates. This comes out more plainly in districts of high cultivation and dense population, where the subdivision is excessive. In Owari province, a rich coastal plain, the per capita allowance of land to the rural population twenty years ago was barely ½ acre. This is the per capita for the whole island of Hondo to-day; but it drops to 0·432 acre in the island of Kiushiu, and to 0·426 acre in Shikoku. A per capita of 1½ acres is found in only four provinces. In the colonial land of Hokkaido (Yezo) the average farm is nearly 8 acres, and the per capita is 1·46 acres.

This pulverization of the land appears again in another form: each farm is made up of several scattered fields. According to the last available returns in Japan proper, over half of the paddy-fields (fifty-three per cent.) consist of lots less than ⅛ of an acre in extent, while the upland farms generally consist of lots measuring double that area. This piecemeal subdivision of the farms means a considerable waste of productive area in the boundary ridges between the fields, where these are not planted, but left as footpaths for the farmers going to their work. To remedy the evil, the Government is engaged in a system of adjustment to increase the average of the paddy lots to ½ an acre or more. This change will economize the farmers' time by combining his scattered holdings into one large plot. It will also facilitate the use of animal labour in the tillage, and the drainage of the paddy-fields for a second rotated or dry crop. Finally, by the economy of the space lost in the boundary ridges, it will recover three per cent. of the total area so adjusted, according to official estimate, and it will increase the yield fifteen per cent. The Government is at present dealing only with the paddy-fields; but as these constitute over half the tillage area, its work may be far-reaching. Formerly the law required that two-thirds of the owners concerned must consent to the readjustment before operations could begin, but now one-half is sufficient The need of utilizing every foot of land is evidently urgent.

Such are the geographical conditions which have dominated agriculture in Japan. Until 1868 they operated practically without interference, for Japanese soil fed the Japanese people. After that date this big complex of local factors came into conflict with another large group emanating from the world environment of the modern Japanese state. With the abandonment of the seclusion policy, the dwarf, hand-tilled rice and bean field of the Japanese farmer suddenly came into competition with the vast agricultural tracts in all parts of the world. This has involved a violent readjustment, which means always maladjustment.

From time immemorial the farms have furnished the chief productive power of the Japanese people. Agriculture still constitutes the basis of the national finance, as in a mediæval state, while Japan has launched upon the expensive career of a modern world-power. The industries and commerce, backed by a large colonial or national territory, which form the economic basis of typical modern states, are there only nascent; so they need the coddling of light taxation. The farmer class is therefore still the main support of the nation. Hampered by the limitation of a cramped area, it has been forced to shoulder a crushing burden. The land tax at present amounts to 8 per cent. of the value of the field. This together with other local rates adds up to 12·5 per cent. as direct taxation. If other indirect taxes are added, the percentage goes soaring.

The dwarf farms of 2½ acres which must support a family of five or six can ill afford such a drain. Consequently, small peasant proprietors are disappearing at an alarming rate. Their farms are being mortgaged and absorbed into the larger estates. During the past decade, 10 per cent. of the total land under cultivation was transferred to the class of tenant farms from that of fee-simple holdings. The condition of the Japanese farmer to-day is therefore pitiable. He and his family work early and late. They are simple, frugal, patient, uncomplaining—monuments of mute patriotism.

The PRESIDENT (before the paper): A short time ago in a London club I took up a book which was entitled 'The Influence of Geographic Environment.' This book was written by an author who was evidently a master of the subject with which he or she dealt. It was written with great knowledge of the subject, no inconsiderable powers of reasoning, and a most agreeable style. The name of the author was Miss Semple. I did not then know that at no distant date I should have the honour of presiding over a meeting of this Society at which this talented lady would give us the privilege of a paper by herself. I believe Miss Semple would admit that her master in the science to which she has especially devoted herself was Prof. Ratzel, the well-known geographer of Leipzig, no longer living, who was the greatest authority in his time on what we now call anthropogeography. It was with this eminent man that Miss Semple first studied, and then returning to her own country she proceeded under his inspiration to write and to give to others the benefit of her studies and of her knowledge. One of her books, entitled 'American History and its Geographic Conditions,' attained so rapid and widespread a fame in America that it was at once adopted for the ships' libraries in the Navy of the United States. It has since become a text-book in American Universities, and is used in the readings of the public school teachers in many states in that country. Miss Semple was telling me just now that only during the past summer she has been lecturing at Oxford. We have, as you know, a rising school of geography there, and I regard it as a testimony to their own good sense as well as to Miss Semple's abilities that they invited her to lecture to them during August last. In the course of last year our guest of this evening paid a visit to Japan, and there, walking through the interior, she made a particular study of that branch of geography which she has especially taken under her charge, namely, the study of the geographical factors of a country in the utilization of its natural resources. She is about to give us the results of these experiences, and having had

the advantage of reading her paper I can assure you a privilege lies before us this evening.

The PRESIDENT (after the paper): Twenty-five years ago I happened to be travelling in Japan, and at a town in the interior I had the good fortune to meet an English gentleman who was then in the official employ of the Japanese Government, and was reported to me as knowing more about the life of the people in the interior of Japan than any Japanese himself. This gentleman had just returned from a trip which he had been making in an unknown part of the country, as far as I remember in the villages on the northern shores of the principal island looking on to the great Sea of Japan, and I remember his telling me some of his experiences, among which was one to the effect that he had visited a village, so primitive, so remote from the main tides of modern life, that the people were still obtaining fire by the rubbing of sticks. That gentleman was Prof. Gowland, then head of the Imperial Mint of Japan. Since then he has transferred his residence and activities to this country, where he has been doing good work for some years in connection with the Royal School of Mines. Perhaps Prof. Gowland will say a few words.

Prof. W. GOWLAND: First I may be allowed to thank Miss Semple most heartily for the extremely interesting and able account she has given us of the effect of geographical conditions on the agriculture of Japan, and for the very eloquent manner in which she has set forth the advantages of being an island-dwelling people. The account which she has given us of the rice culture, together with splendid illustrations which we have seen on the screen, is almost exhaustive, and I am pleased to find that Miss Semple has laid such emphasis on the amount of human work which is required for it. In the cultivation of his other crops the farmer is no less industrious—in fact, he is the most hard working man in the world. His system I would compare to market gardening on a scale of great magnitude. Every crop which he grows has to be planted in rows, and the weeds are very rapid in growth, so that with weeding and other operations the whole of his household is almost continually engaged from sunrise until sundown in some work or other in connection with the field. In consequence of this arduous work, an acre of ground in Japan will yield more produce than an acre of ground in any other part of the world. On the Osaka plain every field yields two crops every year, the sequence of the crops being varied with rice as the principal. Thus we have barley and rice, rape and rice, and barley and cotton. In the cultivation of cotton the procedure is extremely curious and represents very well the intensive culture which Miss Semple has spoken of. The barley is planted in rows and after it has grown to a certain height the cotton plants are put in on one side of each row in such a way that they are protected from the prevailing winds. After a while when the barley is ripe the ears are removed by means of a comb, and the straw is left standing in order to protect the cotton plants, because they are still not sufficiently strong to stand alone. After one or two weeks the straw which is standing in the fields is gathered together at its uppermost ends at every 2 feet apart, in order to allow the young plants to have more sun and air. Afterwards, when the plants are 8 or 10 inches in height, the straw is plucked up by the roots and the barley field is converted into a cotton field. It is by such methods as these that the Japanese farmer has been able to produce sufficient food for the many inhabitants of the country.

With regard to the villages which Miss Semple visited, they are at a lower elevation than in other parts. For instance, in the districts of the Nakasendo, in Shinano and Hida and the regions around, many villages are at 3000 and some at 3500 feet; and as regards agriculture, I found dry rice growing at a height of 3800 to 4000 feet, barley at 4200 feet, buckwheat 4800 feet, potatoes 4000 feet,

and millet 4300 feet. In these villages rice is too valuable a food for the people to partake of. They live almost entirely on a species of millet or buckwheat, together with some few potatoes, and the rice is sold, a small quantity only being kept in the house for the entertainment of visitors. A curious feature in connection with agriculture there is the growth of potatoes as a first crop when a clearing has been made in the forest, after the timber has been cut down. With regard to cattle and sheep, as Miss Semple has said, meadows and pastures are a great want in Japan. The small bamboo grass of which she told us is fatal to sheep, as the spicules it contains produce inflammation of the stomach. It is, however, strange that it has been found difficult to have pastures in Japan, because on the lower uplands of all the mountain ranges there are hundreds of square miles of magnificent prairie country, with luxuriant growth of wild flowers and plants of all kinds. It would seem not impossible to get foreign grass to grow upon those prairies if the Swiss method was followed, of arranging the watercourse so that the grass might be periodically flooded. With regard to the geological conditions, I can support what Miss Semple has said. In all the chief mountain regions of the country I have found but little basalt or basic volcanic rock, chiefly outbursts of andesite, which on decomposition does not yield a fertile soil. It is surprising that the Japanese are able to raise the crops they do from this comparatively infertile soil. This would be impossible were it not for the warmth and moisture of their splendid climate. The want of cheap transport is a serious hindrance to the extension of agriculture in the country. During recent years good roads and railways have been made, but agricultural produce requires a much cheaper mode of transport. There still remains a lack of water communication, as the large rivers are only navigable, and then only by boats, for a few miles from their mouth. It is true that it is possible to bring produce down from the interior by the boats shown in one of the photographs, and the voyage down the river can be made in about ten hours, but it takes three days to get the empty boat back again. The Government are, however, extremely enterprising with regard to transport. One of the most important undertakings is the piercing of a tunnel through the hills which separate Lake Biwu from Kioto, and through which a canal is led. By means of this canal boats can take a load on the shores of the great lake, and, passing through this tunnel, connect with the Yodo river and by it with the sea. The cost of transport from the provinces of Omi and Mino has thus been marvellously reduced. Finally, I have to thank Miss Semple for the extremely interesting lecture.

Prof. L. W. Lyde: I am very glad to have this opportunity of expressing my own gratitude to Miss Semple for much help she has given me through her published works, but I do not feel competent to offer much criticism. The secretary kindly sent me a copy of her paper beforehand, and I made time to read it, but she has departed so far from the paper that it is not fair to criticize it. But there are one or two things I should like to ask her. In her paper she said, and in her lecture she implied, that the first impulse of an island control was to agriculture, and then she says that islands do not originate their own civilization. I would like to know whether she still adheres to that? I believe firmly all our civilization comes from islands. It is only in the fishing races you get true democracy, in which man and man are equal in the jointly owned boat, and man and woman equal in the common home. She has to do all the business on land while the man is away, and therefore can only spare a little of her time for agriculture. The whole development of the silk industry in Japan rests on that one fact. Japan has three million people and 400,000 boats connected with fishing. Every island race from Japan to the Hebrides, and the South Sea islands to the Lofotens, declares that civilization, as judged by the position of women, is based on the democracy of a

fishing race and comes from the island. Then she said just now, too, that the climate of Japan was mild. I cannot myself reconcile the word "mild" to monsoon conditions. The essence of "monsoon" is contrast, great extremes, great heat, great cold. There are very great contrasts Japanese. Even at Tokyo temperature ranges from 15° F. to 98° F. I do not call that a mild climate. Miss Semple said the average holding was 2½ acres; certainly two years ago the average was nearly 4 acres, and since then the size has increased. Perhaps 2½ acres "per family" implies that more than one family may be on one farm. In her paper, too, she says that the condition of things in Japan "prohibits the use of the most useful tools and exacts a wasteful labour." But the spade is the best weapon in agriculture, as in war and archæology, and in Japan 20,000 persons are provided with complete food off one square mile of cultivated land. You cannot call that a wasteful system! Then she implied that the volcanic area was very large, but it is not more than one-sixth, and it seems to me there is ample compensation for that in the fact that the liability to vulcan and seismic trouble first of all prevented the people from concentrating their attention on city building and then taught them to face sudden danger with composure.

Miss Semple: The gentleman, in criticizing my statement about Japanese methods of agriculture in some respects eliminating the use of the best implements and of animal labour, has taken a sentence from one page and applied it to another topic on another page. My statement that animal labour and the best implements could not be used in Japanese agriculture was limited distinctly to interculture, illustrated in the picture showing the simultaneous cultivation of beans and barley. I would like to see the gentleman drive a pony through that barley and bean field without treading down something there. In regard to the small size of the farm holdings, my authority was the Japanese Year-Book for 1911. A similar statement is made also in Mr. C. Ito's Report upon the Agricultural Association of the Ito family. This manager of the great Ito estate makes a further statement that over half of the farmers of Japan (55%) cultivate less than 2 acres, and that only one per cent. of the farming population cultivates 12 acres or more. Combine those two facts and I think you will find that the average would approximate 2½ acres, as stated in the Japanese Year-Book. If you consider the northern island Yezo, where you find the Japanese colonial area, that is, land newly developed where you have typical colonial conditions, instead of the 30-square-league farm of the Argentine or the 100,000-acre farm of the western part of the United States and Canada, you get a munificent average of 8 acres! With regard to the statement that I made in my paper—and I have diverged from that paper because it would have kept you here until nearly midnight—that islands were the natural nurseries of civilization, but that they did not originate their civilizations, I maintained that they picked from the continent such seed of civilization as originated there, transplanted them to their island environment, cherished them in the protection of that environment, and so perfected the flower of that civilization that it appeared finally to be original and indigenous; but if you traced it back, you could find the original seeds on the near-by continent. Now, if you take the history of England, for instance, you will find that most of the seed of early English civilization can be traced back to the Continent. England has taken the best that the Continent had to give. The power of selection is a great power. What she has taken she has improved until differentiation has done its work; thus England has brought European civilization to its highest. Japan has done the same thing for Asia. She borrowed the elements of her agriculture, her art, her architecture, most of her religions, her written characters, the models for her literature, from China or Korea. They came into Japan first over the natural

bridge which Korea made to this island realm. She borrowed generously, but she has modified generously. The Japanese character is conservative. That which she has taken from China, like that which she has taken from the modern world, she has adapted to her uses and to her national ideals. Take another example. Crete in 1800 B.C. was one of the most original islands we have ever found, but the indications are that it also borrowed to some extent from Egypt, to some extent apparently from other neighbouring lands.

The PRESIDENT: I am sure before you go you will wish me to express your sentiments of gratitude to Miss Semple. We have had an unusual experience to-night, for in place of the somewhat cautious compliments that are usually addressed to the reader of the paper, we have listened to a series of searching questions put by an intrepid professor, and responded to by Miss Semple with a spirit and ability that has given us all the greatest delight. Three things struck me chiefly about the paper: first, the extremely keen and observant eye which Miss Semple must have directed to the objects of her inquiry; secondly, the wonderful beauty of the slides she showed us, many of them from photographs taken by herself; and, thirdly, her unusual power, equally visible in the printed paper which she did not give, and in the extemporaneous lecture which she did give, of deducing from the phenomena of material existence large generalizations and scientific laws. With these words I will ask you to join me in carrying a hearty vote of thanks to Miss Semple for her lecture.

RECENT SURVEYS IN NORTHERN PATAGONIA.

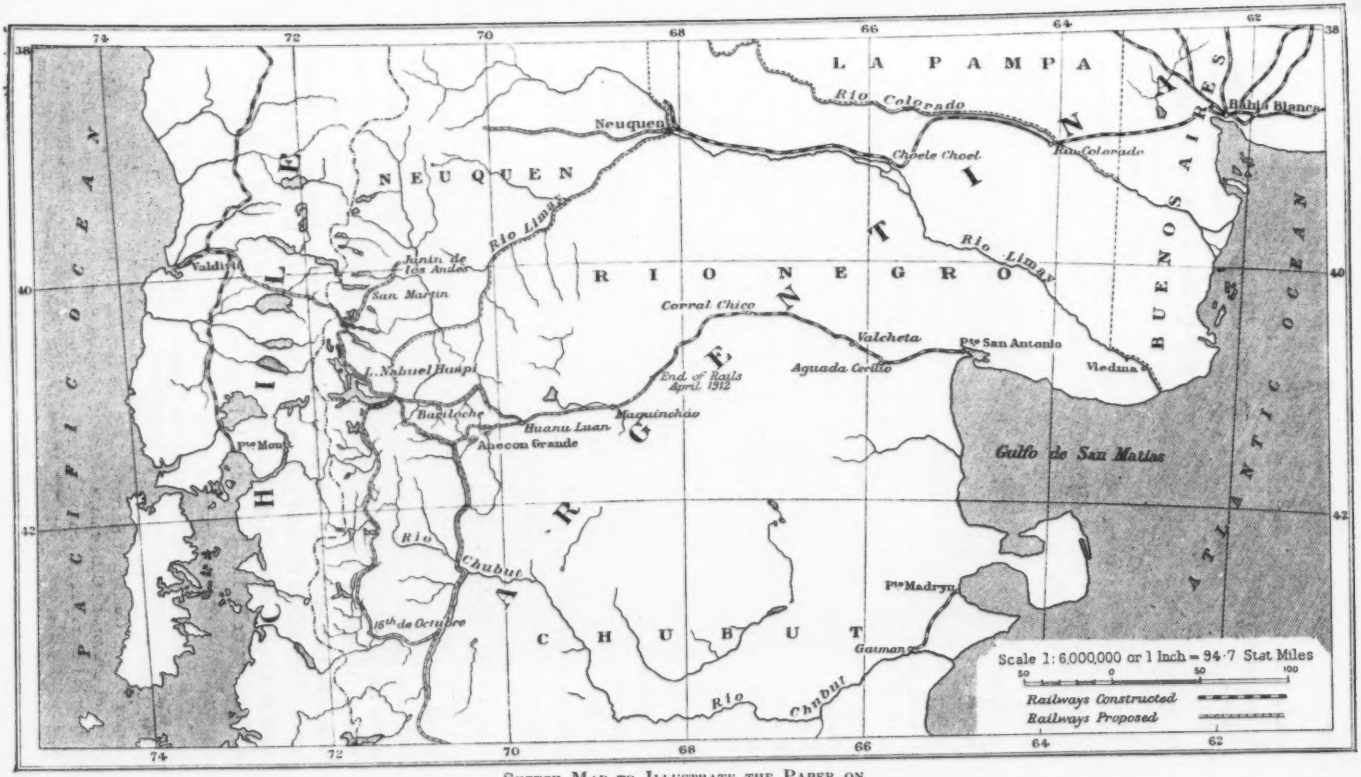
By BAILEY WILLIS.

SURVEYS of the boundaries, rivers, and railways of Argentina have during the past century extended a network of measurements around and over the country, covering it with a finer or larger mesh of surveyed lines and affording a general knowledge of the principal geographic features. The railway network is comparatively close over the Province of Buenos Aires and neighbouring central provinces, but lines have only recently begun to extend in Rio Negro, Chubut and Santa Cruz, the territories that represent what was formerly known as Patagonia. Although occupied by immense herds of sheep, and smaller numbers of cattle and horses, in part owned by estancieros but in general by nomadic squatters, these territories are still to a great extent known to geographers only through the itineraries of explorers. An Argentine statesman, Ezequiel Romos-Mexia, has for the past six years shaped the policies of the Ministries of Agriculture and of Public Works, which he has successively filled, toward the development of the national territories and has pursued the purpose of building railways into the so-called desert regions of Patagonia to promote settlement and change them into populous provinces, as has been done with the "Great American Desert" of the United States. Three lines of railway have been begun under the Minister's administration, one from Puerto Deseado in Santa Cruz, another from Rivadavia in Chubut, and the third from Puerto San Antonio in Rio Negro. The surveys to which this article

relates have been made during the past year in the zone to be traversed by the last named, the railway which was originally projected to connect San Antonio on the Atlantic with Lake Nahuel Huapi in the Andes, and is now designed to become a transcontinental trunk line extending with the co-operation of Chile to Valdivia on the Pacific. Branches will be thrown out from it in the Argentine Andes, one southward 150 miles to the flourishing colony of the 16 of October, the other northward 100 miles to the old settlements of San Martin Jumin de los Andes. Both these branches and the extension to Chile traversed regions of great scenic beauty in the Cordillera, often called the Switzerland of Argentina. Tourist travel will eventually be attracted, and union of the Argentine and Chilian railway systems by broad gauge road with moderate grades cannot fail to be of great advantage to the intercourse between the two countries.

Francesco P. Moreno, the Argentine explorer of Patagonia, originally pointed out the route from San Antonio to Lago Nahuel Huapi, the ocean port and the great lake in the same latitude being obviously future centres of population whose growth he foresaw with youthful enthusiasm on his first journey in 1879, when the region was still occupied by hostile Indians. His itineraries were the principal source of information up to 1904, when Ramon Guerrera made a topographic reconnaissance with triangulation of a considerable area south-east of Nahuel Huapi, which did not, however, extend to the eastern half of the continent. Guerrera's map was never published, nor his work continued, and so it was that engineers, starting from San Antonio, projected the railway westward across Patagonia toward Lago Nahuel Huapi, with but very inadequate knowledge of the country they must cross. Railroad building in Argentina has been mostly in the vast plains of the central provinces, and the treeless plateaus of Patagonia are not so different in aspect as to immediately suggest the need of careful preliminary topographic surveys before striking out on a direct line for the objective point. But when difficulties were met, it became evident that accurate topographic maps and geologic studies were necessary to overcome them.

Argentina has much in common with the United States in the problems which her territory presents with reference to surveying and settlement. Vast areas are to be made known and populated according to the resources they offer, and the essential information must be gathered rapidly, with economy, yet with adequate accuracy. Patagonia may be compared topographically with the high plains of Kansas and Texas, and as to climate in part with Arizona, regions which have been greatly aided in their development by official government surveys by specially trained men. The Minister of Public Works, Ramos-Mexia, applied to the United States Government through its minister, Mr. Sherril, and the writer, a geologist of the United States Geological Survey, was given leave of absence to enter into a special service with the Argentine government, by which he



SKETCH MAP TO ILLUSTRATE THE PAPER ON
"RECENT SURVEYS IN NORTHERN PATAGONIA" BY BAILEY WILLIS, 1912.

was authorized to engage five North American associates and three Argentine engineers.*

Surveys in Patagonia (territory of Rio Negro) were begun in March, 1911, and will be continued till March, 1913, under the existing agreement. The first winter season from March to October was spent in the eastern portion of the Territory, with Valcheta as headquarters. The dry, moderately cold weather was very favourable, high winds alone interfering occasionally with continuous field work. The railroad had already been built and was in operation beyond the district under survey, to Kilometro 326 (203 miles), and the work was greatly facilitated by the ready transportation along the line. A passenger coach and several baggage cars were placed at the disposal of the Comisión, and were fitted up as offices, photographic laboratory, and central commissary. Triangulation, a well-controlled line of levels, and topographic surveys with plane-table were extended from San Antonio westward. The railroad was taken as a median line, and the topographic surveys adjacent to it were carried out on a scale of 1 : 100,000, with contours 10 metres apart in altitude, covering a zone of 10 kilometres (6 miles) in total width. During the first six months, this work extended over about 220 kilometres (137 miles) of the line, *i.e.* over 2300 square kilometres (888 square miles). Concurrently surveys on a scale of 1 : 200,000, with contours 20 metres (65 feet) apart in altitude, were carried out, outside of the more detailed work between Valcheta (Kil. 109 (68 miles)) and Corral Chico (Kil. 216 (134 miles)) covering about 4000 square kilometres (1545 square miles). Geological studies and an examination of the soils, waters, and conditions affecting grazing, were made as the topographic work progressed, the maps being photographed for the specialist's use.

The essential need of the railroad in this eastern district is good water. The rainfall varies periodically from 200 to 300 millimetres (8 to 12 inches) per annum, and diminishes as we recede from the coast to about halfway across the continent, thence toward the Cordillera it increases more rapidly. San Antonio and the railway depended entirely upon rainwater collected in cisterns or obtained in small amount from tube-wells sunk in the sand-hills along the coast, until the rails reached Valcheta, 109 kilometres (68 miles) distant; there a clear and constant stream runs across the arid plateaus, and from it water is hauled daily in tank cars to the city. A small spring, "Aguada Cecilio," had been tapped and various wells had been sunk between San Antonio and Valcheta, but

* The survey is officially known as the "Comisión de Estudios Hidrológicos del Ministerio de Obras Publicas," and is composed of: Bailey Willis, Geologist and Chief, U.S.; E. E. Frey, Secundo, Argentine; C. L. Nelson, W. B. Lewis, Topographers, U.S. Geological Survey; J. R. Pemberton, C. Washburne, Geologists, Stanford University, California, and U.S. Geological Survey; Wellington D. Jones, Economic Geographer, Chicago University; Walter Graenacher, Otto Lugenbuehl, Assistant Topographers, Swiss.

the water was more or less saline. Two deep wells, 105 metres (345 feet) deep at San Antonio, and 270 metres (886 feet) deep 62 kilometres (39 miles) west of the city, were unsuccessful. Nevertheless it had been the hope of the minister that geologic studies would develop artesian waters. They showed, on the contrary, that artesian waters do not exist in eastern Rio Negro, and had they been made a year sooner, they would have prevented the needless expenditure for the two deep wells.

Northern Patagonia is an old, deeply eroded, continental mass, com-

FOREST OF THE ARGENTINE ANDES, NORTH OF LAKE NAHUEL HUAPI. THE JUNGLE GROWTH IS A VARIETY OF BAMBOO, AND THE TREES ANDEAN BIRCH.

posed of metamorphic slates, probably Paleozoic, and cut by eruptive granites and rhyolites. Over this basement occur thin marine and fresh-water sediments, probably Eocene, which are capped by flows of basalt and andesite, and are irregularly distributed in more or less extensive remnants. Near the coast are younger Tertiary or Pleistocene clay and gravel deposits, with layers of secondary limestone.

As these conditions excluded the possibility of finding a water supply for the city and railway by artesian boring, attention was turned to the

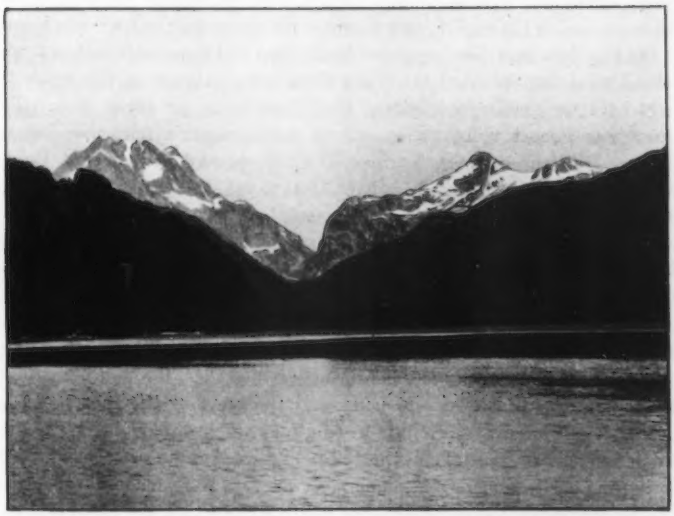
Arroyo Valcheta, the clear, constant stream already referred to, and it was found that the waters could be impounded in a reservoir from which they would flow to San Antonio by gravity. The possibility of thus supplying the city had not been recognized in advance of the topographic surveys which demonstrated it, and had not been looked for, chiefly because the railway between San Antonio and Valcheta crosses a high plain nearly 50 metres (164 feet) above the Arroyo Valcheta at the railroad. Conducting the water from upstream into a high reservoir and finding a lower pass in the ridge solved the problem.

The Arroyo Valcheta is of a type common in the warped plateaus of Patagonia. Its waters gather from rain and snow in elevated lava fields, 1000 metres (3281 feet) or more above the sea, and finding no well-defined surface channels trickle underground till they issue in large springs at the base of the bold escarpment. Thence the stream flows in meadows and swamps, constantly losing by evaporation in its course and finally dies in a salt lake in a basin without outlet to the sea. The diversion of a part of its waters to a reservoir will redeem a large area suitable for growing alfalfa and turn a waste into use, as well as provide the necessary supply for the railway and San Antonio, for which no other source seems available. The natural reservoir from which the head springs issue, the lava plateau surmounted by volcanic peaks that rise to 1800 metres (5906 feet) above the sea, appears to guarantee an adequate and constant flow, and records of twenty-three years show that during that period it never has failed.

The explorations, detailed surveys, and engineering plans for the Valcheta reservoir and pipe line occupied the force till October, when the opening of spring made work possible in the high plateau region further west, where severer winter weather and heavy snow had previously prevented it.

In crossing the continent the railway rises from the Atlantic, not by a series of terraced steps, as has often been described, but by passing across interior basins from one plateau to another, the continental surface being warped, so that basins without outlets to the sea range from south-east to north-west between high plains. The plains grow higher towards the west. About midway of the continent, at Maquinchao, the valley, which corresponds to a depressed area, is 900 metres (2953 feet) above the sea, and with very gradual ascent it extends 100 kilometres (62 miles) west by north. The projected railway line follows it toward a conspicuous mass of volcanic peaks, of which the highest, Anecon Grande, somewhat exceeds 2000 metres (6562 feet) in altitude above the sea. The peaks are bold, rocky remnants of ancient volcanoes, long since stripped of cinder and ash deposits, which are spread about them and to a great extent covered by later basalt flows. This mesa-surface lies between 1200 and 1600 metres (3937 to 5250 feet) above sea. It is cut by valleys and canyons 100 to 180 metres (328 to 590 feet) deep, which radiate from Anecon Grande, and shed their waters to the Rio Limay on the north or the Rio Chubut on the south.

To reach Lago Nahuel Huapi, the railroad must traverse the rugged region of mesas and canyons about Anecon Grande in central northwestern Patagonia, and descend some 400 metres (1312 feet) into the pre-Andean depression into which the lake opens with an elevation of only 770 metres (2526 feet) above sea. Preliminary surveys for a line had sufficed only to make apparent the difficulties of the terraine, which are in fact greater from the point of view of the railroad engineer than the obstacles opposed to location by the Andes in this latitude. A general topographic survey of the region was ordered by the minister, and having been begun in November, 1911, was carried on till April, 1912. It resulted in the mapping of 4,000 square kilometres (1544 square miles)



THE PASS OF THE CAJOU NEGRO, WITH LAGO VILLARINO IN THE FOREGROUND. THE TRANSCONTINENTAL RAILWAY FROM SAN ANTONIO TO VALDIVIA WILL PIERCE THE RANGE IN A TUNNEL A MILE LONG AT 3800 FEET ABOVE SEA IN THIS PASS.

on the scale of 1 : 100,000 with contours 20 (66 feet) to 20 metres, and the tracing of a practicable route for the broad gauge railway, which will have a total length of about 700 kilometres (435 miles) from San Antonio to Lago Nahuel Huapi. A well-controlled line of levels was carried through to the lake, and the network of triangulation was completed, uniting the Atlantic coast with the peaks of the Andes.

Lago Nahuel Huapi is a beautiful sheet of water, which, from its outlet to its head, extends 60 miles from the Pampas to the heart of the Andes. It lies like a deep canyon between sierras that rise 4000 feet above it, and branches irregularly among them as does Lake Lucerne, with which it is often compared. During nine or ten months of the year the mountains are

snow-covered, and the scenery is strikingly Alpine. The boundary between Argentina and Chile follows the crest of the range round its headwaters and tributary lakes. The region had, therefore, been surveyed under the direction of Moreno, and excellent reconnaissance maps with sketch contours are included in the Argentine Evidence before the Arbitration Commission. Nevertheless there existed much uncertainty as to the practicability of a railroad from Lago Nahuel Huapi across the Andes to Chile, the very name of the Cordillera inspiring doubt in the minds of those unfamiliar with achievements of railroad building across mountain chains. To set these doubts at rest, and to complete the plan of the transcontinental line, the minister ordered an exploration of the mountains and passes north and west of Nahuel Huapi. On conferring with those best acquainted with the region, two passes were suggested; one a route known as the Puyehue pass, long ago used by Indians and Spaniards and in recent years by the settlers about the lake; the other a gateway in the mountain crest between granite precipices, El Cajon Negro or Black Box. The latter was almost unknown except to the surveyor's telescope, but an eminent Chilian engineer, Enrique Döll, at present Director of Public Works for Chile, had visited it about 1900 to set the boundary monument, and was of the opinion that it could be reached by railway.

The approach to Puyehue pass is by profound gorges, overhung by cliffs that suggest Yosemite scenery; the ascent could be accomplished only by steep grades; and the summit being broad, almost plateau like, the line would be exposed for a long stretch to obstruction by winter snows at an elevation of 1200 to 1300 metres (3937 to 4265 feet). The Cajon Negro, on the other hand, can be reached by moderate grades, through beautifully forested valleys, past exquisite lakes, and the crest of the Sierra can be pierced by a tunnel about a mile in length at an elevation of 1180 metres (3873 feet) above sea. The exploration of these routes was accomplished during the early summer and plane-table surveys were made covering the line by the Cajon Negro, so that we may now say that the topography of the railway route from San Antonio to the crest of the Andes has been mapped and the preliminary location determined. The surveys are being continued with the further object of fixing the railway location in detail and of completing the scientific and economic studies of the trans-Argentine zone on the 41st parallel of south latitude. It would not be inappropriate to call this the Forty-first Parallel Survey of South America.

The territory of Rio Negro, which is thus to be traversed and developed by a national railway, comprises two distinct regions, whose natural features and conditions, considered with reference to their future economic uses, are so unlike that they should become separate provinces. The treeless pampas, which extend from the Atlantic to the foothills of the Cordillera, are adapted to sheep and cattle-raising with auxiliary agriculture of pasture crops. With the exception of the Rio Negro valley, which is not here considered, there is but a very small area that can be irrigated, and

cultivation will depend upon the waters which accumulate in the high lava-plateaus and sweep through the gravels of the wide seemingly arid valley-plains. Where the fine eolian soil, which in many such valleys is from 1 to 2 metres (3 to 6 feet) deep, is within reach of ground water, alfalfa may be grown advantageously. Otherwise the Pampas of Rio Negro, which cover about 65,000 square miles, must always be given up to grazing, and the Government policy with reference to the public lands and territorial administration should be directed to encourage that industry. To that end the Minister of Agriculture will initiate a policy of leasing public lands for grazing on leases of thirty years under liberal conditions.

The Cordilleran district of Rio Negro, together with the like portions of Chubut and Neuquen, constitutes a unique region among Argentine territories, distinguished by its mild climate, abundant rainfall, large rivers and beautiful lakes, great water powers, and three important raw materials—wood, hides, and wool. Each of these conditions exists in some measure in other parts of the Republic, but their association, especially with water-power, distinguishes this region from any other within the Argentina tariff wall unless we except the semi-tropical territories of Entre Rios and Missiones. This Cordilleran district, with an area of about 20,000 square miles, is adapted to intensive farming, manufacturing, and a dense population which will naturally be recruited from England, Germany, Switzerland, France, and the United States. It is one of the richest possessions of Argentina, a section of the best Andean territory, won from Chile in the arbitration by King Edward, through the patriotic and indefatigable labours of Moreno. Justice should some day require that it be set apart as the Territorio de Moreno, in honour of the great explorer of its valleys and the staunch defender of Argentine sovereignty over its rivers, lakes, and lands.

Argentines have not realized the wealth which these provinces offer for development. Their far-seeing statesman, Ramos-Mexia, has been strenuously opposed in his efforts to make Patagonia accessible, prosperous, and valuable to the nation; but he is succeeding, and now that the resources of the region are becoming known, it may be hoped that his persistent purpose will be liberally supported and carried to completion.

SOME NOTES ON MY 1912 EXPEDITION TO THE SIACHEN OR ROSE GLACIER.

By Mrs. FANNY BULLOCK WORKMAN.

As reported in 1911 in the *Geographical Journal*, Dr. W. Hunter Workman and I, after completing our exploration among the Hushe glaciers and those of the Kondus system, crossed to the Saltora valley * and traversed the Bilaphon La,† 18,500 feet, to the Siachen or Rose glacier on August 19.

* The usual spelling is Saltoro.

† Local name for the Saltoro pass. *Geographical Journal*, vol. **35**, p. 622.

We examined it for some distance above the entrance of the Bilaphon branch, and visited two of its most important affluents, but it was far too late in the season to consider the survey of a glacier the most noteworthy points of which lie at altitudes above 17,000 feet.

The object of my 1912 expedition was to have as detailed a map as possible made of the whole glacier, and to ascend to and examine myself its apparently rather complex sources, and elucidate, if possible, the problem of their relations to regions beyond. Mr. C. Grant Peterkin, who had received the diploma of the Royal Geographical Society and was kindly recommended to me by Mr. E. A. Reeves, F.R.A.S., agreed to act as surveyor. The Surveyor-General of India, Colonel Burrard, R.E., C.I.E., also kindly loaned a native plane-tabler, Sarjan Singh, from the Survey to assist in the work. One Italian Alpine porter accompanied the surveyor's party, and four Italian guides and porters, Dr. Workman and myself. A Parsee, T. Byranji, from Srinagar, who had handled the transport part in 1911, undertook the work this season, and was assisted on the Siachen side by two Sepoy reservist orderlies from the Pindi Division, Royal Indian Army, who did very good work. Goma, in the Saltora valley, was the base for supplies.

On reaching the top of the Bilaphon pass on July 11, the weather being very fine, I decided to attempt an impressive rock and snow-peak lying above an elevated snow-plateau north-west, which was likely to command a wide view towards the upper Siachen. Camping on the plateau at 19,000 feet, the peak was climbed by myself and three guides on the 12th. It proved a difficult mountain, as the last 800 feet were at a very sharp angle, and each step had to be cut in a surface of black ice.

From the top I found myself separated from the great double-summited K_{10}, 25,415 feet, which heads the Dong-Dong glacier, only by the wide snow basin on its north-east side, which we traversed in ascending on that mountain to 20,000 feet last season. Its precipitous walls loomed above us with startling grandeur. North and south the vista of glaciers and peaks, some of which I was able to identify, was grand beyond description. Here I can only say that this ascent being possible at the beginning of the journey was of much value, enabling me, as it did, to get a comprehensive idea of the ice region about to be entered. Full light was also thrown upon certain points regarding the Dong-Dong and Shor-pi-gang glaciers explored by us in 1911. This peak works out from hypsometric observations available at about 21,000 feet, but heights here mentioned will be subject to change when compared with lower station readings obtained from Skardu.

On reaching the Siachen a sheep and burtsa camp was set up at our old 1911 base, the Teram Shehr promontory, which abuts the Siachen at the junction of the large north-east affluent. Sheep were kept here, there being no grass above that point, and burtsa for fuel was collected and sent to higher points. I have named this north-east glacier the Teram Shehr,

which is almost the only native name connected with the Siachen of which the oldest inhabitants have a dim remembrance. A flour base camp with a babu in charge was made on moraine a little farther up the glacier.

All camps of my own party, except for a few days when we descended the glacier, were near or above 17,000 feet for five weeks, and mostly either on moraine-covered ice or wholly on snow, for the Rose glacier offers no dainty plots of soil or grass to the tent-nomad visiting its precincts. The mountain flanks on both sides are so precipitous that it is dangerous to pitch tents on them.

Weather did not admit of our reaching the sources of the glacier at once. On the first attempt lasting two or three days we camped far up the glacier at 18,000 feet, but were driven down in a stinging snowstorm early the next day. Two weeks of very fine weather, however, soon set in, and we were able to accomplish (in this time) what under the usual summer Himalayan climatic conditions might take six weeks of running backward and forward, for, in order to visit what is to be seen at the Siachen sources, clear skies are essential.

Contrary to the usual on this glacier, it was found possible to cut out terraces and camp on a mountain flank at 18,400 feet, just below the high snowfields leading to the north and north-east heads. From here the north saddle or very apex of the Siachen was ascended. Various things of much interest were observed there, but these are notes of where we went, and not a narrative of what we saw. This col is at an altitude of 20,860 feet. The north-east col was ascended the next day. It is not so arduous as the north one, and is less high, about 19,200 feet. We discovered from here some very high peaks beyond the eastern Siachen boundary on the Kashgar side. These are about 7 miles north of and higher than Teram Kangri; one is probably well over 25,000 feet, but it is futile to discuss heights of peaks unless one's data can be verified by careful triangulation.

After another climb to a ridge of 19,700 feet for observation and photography, Dr. Hunter Workman and I headed the caravan toward the glacier leading to the Siachen's west source. We descended the main stream, crossing to the right orographical side. This glacier enters the Rose at about 17,400 feet. Ascending it for several hours we at last found a point free of crevasses, where a camp was pitched on snow at 18,700 feet. We passed three nights here, which made a serious impression on the coolies, there being no lakelets nor recurring streams so abundant on the main glacier. A peerless white peak heads this glacier to the west, of probably 24,000 feet, the exact height will be known later. It is connected by a high col with a lower snow peak, and at the base of this lower peak is another col or depression. The higher col was first ascended, height 19,700 feet, and from it the source of a large glacier was seen about 4000 feet below where we stood. The following day the lower depression was examined, and, what I hoped for, it proved to be the main outlet from

the Siachen on the west, being the summit of a rather difficult but feasible pass for a loaded caravan to the glacier above-mentioned lying west.

Next an ascent was made to the wide snow plateau lying directly under the chief summit of the 24,000 feet peak. This plateau is at quite 21,000 feet, and offers very fine views of Hidden peak, Gusherbrum, and other giants of the region.

Our stint of wonderful weather was now ended, and a snowstorm drove us down to the Siachen. I saw clearly though, that, after finishing our work on the lower part, we should have to return to this icy head and leave the Rose glacier finally by the passage here discovered.

After we had descended the glacier, August 11 found us again on the high Siachen awaiting a chance to advance to the pass. Here fog and snowstorms held us prisoners for nine days. At the beginning of this detention I ordered 40 coolies to return under two Europeans over the Bilaphon for flour, which was now running short. This brought on a strike which lasted eighteen hours. They refused to go for supplies, saying if they went they would not return. Their long visit to the sources had made a deep impression on their minds, and they declared they would not return there. Finally, upon the wazir explaining that if they crossed the new pass, they would have only two days on snow and then be always on moraine down to villages, they gave in and no further complaint was heard. Flour arrived, and one bitterly cold morning under a leaden sky we started with 66 coolies laden with provisions for ten days.

Although it did not appear to be far enough north, we thought the pass might afford a passage to the Baltora * glacier. If not, we should find ourselves probably on the Kondus, which was surveyed in 1911 by our topographer, Dr. C. Calciati. Either way would be new and interesting; the Kondus more novel because bearing no footprints of illustrious predecessors and from the fact that our expedition in 1911 had not pushed up to its extreme upper portion.

We camped a few hundred feet below the summit of the pass, again on snow in a freezing temperature, for by 3 p.m. it was snowing hard. By 6 o'clock it cleared. After a cool night under canvas, minimum temperature 3° Fahr., we ascended under a deep blue sky to the col. Here a boiling-point reading was taken and numerous photographs. The pass works out, pending later data, at 18,700 feet.

Kind indeed was the weather god, who had allowed us three weeks before under sunlit skies to discover this new passage, and again, after dreary cold days of waiting, drew back the curtain of mist for a day, permitting my caravan of 66 to pass safely to the other side under the fairest of skies.

The descent to the glacier is of about 2600 feet. It was smooth going for, say, a quarter of the way down, but after that the surface was seamed from side to side with wide crevasses, some open abysses, others

* The usual spelling is Baltoro.

treacherously covered by soft snow. We reached moraine for camping below the source of the new glacier, which is at somewhat over 16,000 feet.

The next day it became evident we were on the upper Kondus, and the worst monster of a glacier to travel on we have met with in the Karakoram. After one short march from its head ice-bands and easy moraine end, and for four days moraine-strewn ice-hillocks often 400 to 500 feet high must be steadily clambered over. Owing to danger from stones falling from perpendicular mountain walls on its sides, no camps even to the end of its tongue can be pitched except on the tops of these depressing hillocks.

Sometime I shall have something to say as to whether the Siachen is a complement of the Baltora and what are the chances of a passage from one to the other, likewise upon the so-called Kondus and Chogo Lisa saddles.

I am glad to have carried out with fair completeness the task, which has kept me two summers in India, and I think the work will, perhaps, be appreciated by future geographers in the days when the special examination and survey of more restricted unknown areas than vast polar continents become the vogue, as it must perforce in years to come. At least not having the pioneer exploring to do they will be spared the expense, the ennui with irresponsible coolies, and the many obstacles which the Siachen offers as a region for exploration, such as being separated from all base of supplies by two glaciers and a snow pass like the Bilaphon, and from wood by a distance of at least 30 miles.

Still I am satisfied, and pay my deep salaams to the weather god, for without his aid the survey of so huge a glacier could not have been completed, nor could I, considering the perfidious actions of the only headmen available and the prodigious pilferings of the Saltora valley coolies, have had the rare privilege of first standing on two new points of the northeast Karakoram water-parting, of observing their relation to Chinese Turkestan, and of attaining other heights of geographical interest on this largest and longest Himalayan glacier. Other geographical and glaciological features were studies, some relating to questions already discussed but not settled, which must be reserved for detailed treatment.

Mr. C. Grant Peterkin and his assistant made a full survey of the Siachen from its sources to end of tongue at the Nubra river, including its numerous tributaries.

I would add that one of my Italian porters, through momentary carelessness in not testing the ice with his axe, fell into a deep crevasse, carrying with him the only rope with us at the time. He remained there one and a half hours before ropes and the guides were available to extricate him, and died of shock and the effects of cold the same night. I was walking directly behind him, and supposing him to be on the watch for crevasses, noticed nothing until I saw him disappear two steps in front of me. Fortunately I held up on the brink of the chasm and called to the caravan ascending a short distance below.

I mention this because, owing to untrue stories being spread by Skardu coolies, garbled reports were published all over the world by the press. It is a source of satisfaction to me that no coolies in my party were seriously injured or died on the glacier, for the Siachen is incomparably more difficult to move about on than any of the five great Karakoram glaciers, all of which except the Baltora we know pretty thoroughly. One especial danger for loaded coolies is water. In crossing the Siachen opposite Teram Shehr, a distance of about 3 miles, eleven glacial streams were met with this season. Three were at least 10 feet wide and so deep that it was impossible to ford them after 11 a.m.

A FEDERAL BUREAU OF GEOGRAPHY FOR CANADA.

In reviewing the "Progress of Geographical Work in Canada" during the last decade before Section E (Geography) at the British Association Meeting in Dundee, Dr. H. Ami, formerly of the Geological Survey of Canada, raised a point of much importance regarding the co-ordination of results in, and federation of the various departments of the Canadian Government doing geographical work. Dr. Ami argued for one Department of Geography, or Ordnance Survey, for the whole Dominion instead of some sixteen separate branches or sections as at present constituted. On the face of it, such a scheme would prove a source of satisfaction to all engaged in the work, ensure greater accuracy, and very considerably reduce the cost of administration as well as of surveys, besides preventing duplication and re-duplication of work in and out of the offices such as prevails at present.

For several years past, the enormous development and rapid growth of Canada has necessitated the undertaking of a vast amount of survey work and map making, not only in the newer sections recently opened to colonists, or along the less-known lines of commerce by land, by lake, or by sea, but also for the sake of greater accuracy, more precise mapping, and more careful and detailed geographical work all along the line. The establishment of a Geodetic Survey of Canada, the work of more precise levelling, the complete triangulation of many areas along international and inter-provincial boundaries, and in the more densely settled portions of the Dominion, is calling for further precision and co-ordination of results on the part of the various branches of the service now doing geographical work. The subject is one which has ofttimes presented itself to the mind of those who see the progress that would ensue from the adoption of such methods as prevail in older countries, such as Britain, France, or Germany. It was argued that except in the case of the Department of Militia and Defence which, from its very nature and duties, should, in case of national danger, control all the maps and reproduction thereof,

it was quite possible for all the other branches of the Government doing geographical work to unite.

Such an undertaking as is suggested would no doubt confer a great benefit on Canada, and Canadian Geography would be greatly enhanced. It is rather significant that the very department of the Government of Canada, which might control its geographical work for its own purposes, namely, the Department of Militia and Defence, is the one which strongly advocates the matter of federation in all matters geographical for the Dominion Government. The Surveyor-General's Offices, the Geological Survey Branch, the Geodetic Survey of Canada, the Chief Geographer's Office (Interior Department), the Railways and Canals Department, the Post Office Department, the Hydrographic Survey, the Tidal Survey, the Meteorological Bureau, the Astronomical Branch, are some of the different branches doing geographical work in Canada.

When it is considered that Canada contains an area of 3,729,665 square miles, the enormous task of mapping this area accurately and in detail is a strong argument that the task be undertaken by a well-organized and active bureau, from which would issue all the maps that are required by the different departments of the government of the country.

NEW DRAKE DOCUMENTS DISCOVERED BY MRS. ZELIA NUTTALL.

THE discovery by Mrs. Nuttall in the Mexican Archives of new and interesting documents relating to Sir Francis Drake and his voyage of circumnavigation was announced at the Geneva meeting of the International Geographical Congress in 1908, and a translation of one of the documents was printed in the third volume of the report of the Congress, issued in 1911. Mrs. Nuttall was understood to be continuing her researches, and to intend publishing a volume, in which the most important of the new documents should be made generally available, both in the original Spanish and in an English translation; and those interested in the subject have awaited such publication with much interest. Arrangements have now been made for the issue of the promised volume under the auspices of the Hakluyt Society, before the Council of which body Mrs. Nuttall gave an interesting account of her discoveries at a meeting on October 9 last. The following is a summary of the paper read by her, embodying her conclusions as to the new light thrown by the newly discovered papers on the career of Drake, and events in which he took part.*

It was some five years ago, while engaged in research in the National Archives in the City of Mexico (previous to their recent rearrangement)

* The following paragraphs present Mrs. Nuttall's views on the subject, on which it is of course impossible to pronounce a final verdict until the promised volume has appeared.

that Mrs. Nuttall found, in a dark and dusty corner among a loose heap of bound volumes of Inquisition papers, one labelled as containing sixteenth-century correspondence of the Inquisition. On looking through the volume her attention was arrested by a superscription in Spanish script, which read, "Declaration by Nuño de Silva as to how he fell prisoner among English pirates on his voyage from Oporto to Brazil, May 23, 1579." And on coming to the statement "llamase este ingles Francisco Drac" (this Englishman is called Francis Drake), her interest was, naturally, still more thoroughly aroused. After transcribing the pilot's declaration (which was the document of which a translation was printed in the report of the Geneva Congress), she undertook a prolonged search for other documents relating to the subject, not only in the Mexican Archives, but in the Archives and Libraries of the United States, England, Spain, France, and Italy.

Among the much larger number of documents examined, Mrs. Nuttall has selected sixty-one as the most important and interesting, and of all these she proposes to publish transcriptions and translations. Of the total number, the originals of fifty-four are in Spanish, five are in English, one in Portuguese, and one in Latin. Of the Spanish documents, only five have yet been published in the original texts, and only one in an English translation, viz. Nuño de Silva's account of his voyage with Drake published in 'Hakluyt's Voyages,' edition of 1599–1600,* and also as an appendix to the Hakluyt Society's edition of 'The World Encompassed,' issued in 1854. On the other hand, this particular document has never been printed in Spanish, while the printed English version omits important details. Of the five English documents two only have been quoted by historians, while the Portuguese and Latin MSS. are also unpublished. Foremost in importance in the whole series are the different accounts of Drake's voyage given by Nuño de Silva, who accompanied the navigator from the date of his capture (January 19, 1578) to that of his release at Guatulco, April 15, 1579. To the narrative already printed in English can now be added, (1) His first deposition after landing at Guatulco—a comparatively short one, but containing some important details; (2) his sworn depositions as prisoner before the Inquisition, preserving evidence missing from the previous depositions; (3) the log-book in which he made daily entries throughout his captivity with Drake.

As a complement to these accounts we have two given by John Drake, who accompanied his cousin as a page, which have hitherto been little known. There are also the depositions of ten persons—eight Spaniards, one Portuguese, and one Fleming—who spent days or hours on the *Golden Hind*, either as prisoners or as visitors. These throw a most interesting light on his personal characteristics and in some cases record his actual utterances. Still more important are the sworn depositions

* Mrs. Nuttall, by a slip, says 1625.

made respecting Drake by his old comrades, Captain John Oxenham, John Butler, and another, when examined before the Inquisition at Lima, to which reference is made below. The documents respecting Nuño de Silva relate to his four years' imprisonment in Mexico, his trial for heresy, and his return in 1582 to Spain, where he entered into the service of Philip II. There are also official reports from the local authorities to the Viceroy, and from the latter to the King of Spain, relating to the Guatulco episode, and the fruitless efforts to despatch armed expeditions in pursuit of Drake.

The evidence of the whole series appears to Mrs. Nuttall to furnish final solutions to several of the most important disputed questions concerning Drake's voyage of circumnavigation. Not only is it seen that Drake was sent on the voyage by Queen Elizabeth herself, but that it was regarded and described as a *voyage of discovery*, of which the purpose was "to discover good lands where settlements could be established." Oxenham states that Drake had often spoken to him on the subject, saying "that if the Queen would grant him a licence, he would pass through the Strait of Magellan and found settlements in some good country." The evidence of Oxenham and his fellow-prisoners shows that in England the necessity for colonies was treated at the time as a burning question. We read that "England is so full of people that there are many who wish to go to other parts of the world." Also that "four years previously Sir Richard Grenville had formed the project to penetrate into the South sea through the Strait of Magellan in order to search for land or some islands where settlements could be established, because in England there are many inhabitants but little land." *

These statements are corroborated by other evidence. The questions put to Oxenham and his companions show that the Spanish authorities saw, in Drake's entry into the South sea, a menace to Spain far greater than a piratical venture could possibly be, and that Drake was regarded as having the power of the English Crown behind him. When examined by the Inquisitors as to Drake's authority, the Portuguese pilot told them that, when Doughty was sentenced to death, he challenged Drake to produce evidence of his power to execute him, and that the latter took out some papers, kissed them, and then laid them on his head. After reading them aloud, he permitted all present to inspect them, and all did so.

The pilot also states that Drake and all his men always proclaimed that they had been sent by the Queen, and expresses no doubt that such was the case. He describes a bronze cannon on the *Golden Hind* as having

* Mrs. Nuttall speaks of these statements about supposed over-population as "a revelation." They are, however, to some extent paralleled by other documentary evidence of the time, *e.g.* the instructions for the Arctic voyage of Pet and Jackman, where the need for finding work for the unemployed home population by opening outlets for English manufactures was strongly insisted on.

engraved upon it the arms given to Drake for the voyage—a world traversed by a band with a north star. Again the pilot's log-book, in conjunction with a rare French map brought to light by Mrs. Nuttall, which she shows to be older than the Hondius map of 1595,* as it was "seen and corrected" by Drake himself, confirms the English voyager's title to having discovered the open communication between the Atlantic and Pacific oceans.† Although the discovery seems to have been carefully concealed from the pilot, the latter made an entry (corroborated by John Drake) that on September 24 they anchored off an island lying in 59° south, not on the first but on the second occasion on which they had been driven south by the terrible storm encountered.

The fresh evidence further establishes Drake's age; assures us that he spoke Spanish fluently; and explains and justifies many of his actions by revealing their motive. Thus we learn that when he entered the port of Callao at night and cut the hawsers of two large vessels, it was because he hoped the wind would drive them out of harbour, where he could seize and hold them in ransom, demanding in exchange the release of John Oxenham and his comrades. From the lips of his Spanish prisoners, who give their evidence without the slightest animus against him, we learn how Drake looked and what he said; how he conducted daily services on board; how he dispensed hospitality; how he joked with his prisoners and took them into his confidence. The evidence now brought together also permits us to form a far higher estimate of the Spaniards then living on the Pacific coast than might have been thought possible. The letters, reports, speech, and actions of the Spanish officials and witnesses reveal them not only as possessing to a remarkable degree the noble qualities for which their nation is celebrated, but as employing a literary style in some cases quite worthy of the age of Cervantes.

POSITIONS DETERMINED BY MR. CECIL CLEMENTI ON HIS JOURNEY FROM KASHGAR TO HONGKONG.‡

Some months ago the Society received from Mr. Cecil Clementi, Assistant Colonial Secretary at Hongkong, a set of manuscript maps, plotted by himself from the route surveys and astronomical observations taken during his journey in 1907–8 across Central Asia from Kashgar to Hongkong. With these maps, which number altogether fifteen sheets, ten on the scale of 1 : 250,000, and five on 1 : 1,000,000, was also received a very complete report drawn up by Mr. Clementi after the termination of his expedition, containing a list of positions fixed by astronomical observation, and heights, together with a full account

* Reproduced in the Hakluyt Society volume of 1854.

† It is to be observed, however, that the map still gives the conventional representation of a continent to the south of Tierra del Fuego, though with a sea interval south of Cape Horn.

‡ Map, p. 680.

of the instruments used and methods of computation. It is proposed that a detailed description of his important journey should be published as a separate volume later on, with reductions of the maps and full lists of the observations; but as the preparation of this must necessarily take considerable time, and the positions determined in latitude and longitude will be of value to future travellers in these regions, it has been considered advisable to publish without further delay a sketch-map of the route, and a short list of the more important places where observations were taken.

Mr. Clementi started on July 12, 1907, from Andijan, the terminus of the Russian Trans-Caspian railway, and, crossing the Pamirs to Kashgar, travelled through Chinese Turkestan and the provinces of Kan-su, Shen-hsi, Se-chuan, Kuei-chou, Kuang-hsi, and Kuang-tung to Hongkong, where he arrived on March 31, 1908. He was not permitted to commence his survey work in Russian territory; but from Kashgar, which place he reached on July 27, 1907, astronomical observations were taken every night when the weather was favourable. The entire length of the route between Kashgar and Hongkong is about 3990 miles, and this distance was covered in 198 stages; 141 places were fixed in latitude, 139 in longitude, in addition to which the height of 185 places was determined. The latitude observations consisted of altitudes of Polaris and circummeridian altitudes of north and south stars, taken with a 4-inch transit theodolite fitted with Reeves' tangent-micrometers. In many instances more than one pair were observed, and as a rule the difference between the results obtained by stars on opposite sides of the zenith was very small, amounting only to a few seconds of arc. In several cases the latitude accepted by Mr. Clementi is the result of an odd number of observations, such as two north stars and one south star, and a slightly better mean might perhaps have been obtained if even pairs only had been used; but as the exact circumstances under which the separate observations were taken and their relative values are unknown, no attempt has been made to alter Mr. Clementi's figures in the list here given, especially as the difference would not in any case have been more than a few seconds.

The local mean time necessary for computing the latitudes, as well as for rates and differences of longitude, was obtained by pairs of theodolite altitudes of east and west stars; and from the lists given in Mr. Clementi's report these appear to have been very satisfactory. For recording all time observations a split second stop-watch was used, in comparison with a half chronometer watch by Blockey, London, and an Odin pocket chronometer. When leaving London in April, 1907, the Blockley watch had a losing rate of about one second per day, but this increased, until on arrival at Hongkong it was found in April, 1908, that the daily rate was 2·2 seconds gaining. The Odin pocket chronometer had, when tested in Geneva in 1906, a mean rate of 3·2 seconds per day losing, but in April, 1908, when examined at the Hongkong observatory it was found that its rate was 0·56 second per day gaining.

Careful and systematic observations were taken almost every night for determining the errors of the watches all through the journey, so there can be little doubt that the chronometric differences of longitudes are very fairly accurate. The errors and rates of the watches are carefully set forth in tables in the report. Mr. Clementi has adjusted the chronometric differences of longitude along the different stages of his journey to absolute longitudes determined by altitudes of the Moon east or west of the meridian, taken at the places indicated by an asterisk in the following list, to Potanin's determination of Lan-chou Fu; Ch'ung-ch'ing Fu and Canton as given on the War Office 1 : 1,000,000 map: Kuei-lin Fu and Wu-chou Fu as fixed by the Department of Research in Terrestial Magnetism, Carnegie

Place-names.	Latitude North.	Longitude East.	Height above sea-level in feet.	Point of observation.	Remarks.
	° ′ ″	° ′ ″			
Kashgar	39 28 45·1	75 58 0·0	4213·0	In the British Consulate at Chinibâgh outside the Mahommedan walled city.	Sven Hedin, 4278·3 ft. Three Russian maps give 4213 ft. as height, and this has been accepted.
Maral-bâshe	39 46 41·5	78 6 20·2	3886·7	Inn outside the south gate of the walled town.	Russian Govt. Map of Southern Frontier Regions 1 : 1,680,000, 3500 ft. Sir T. D. Forsyth gives lat. 39° 46′ 24″, long. 78° 11′ 20′ (Approx.), height 3480 ft., for Maral-bâshe (town).
*Ikûl	40 55 2·8	79 43 3·5	3675·6	Inn in the bazaar.	
Aksu (Chinese city)...	41 7 57·2	79 55 25·2	3894·1	Inn immediately inside the south gate of city.	
Bâi	41 46 58·6	81 58 22·3	4177·8	Near the Yamên.	Sven Hedin, 3002 ft. Russian Govt. Map of Southern Frontier Regions1 : 1,680,000, 3000 ft.
*Kwazil	41 49 14·9	82 39 5·5	4068·4	Official inn.	
Kuchar (Mahd. city)	41 43 49·1	83 7 55·7	3611·6	In the bazaar.	Sven Hedin, 3199 ft. Russian Govt. Map 1 : 1,680,000, 3200 ft.
Kôrlâ	41 44 20·8	86 10 10·4	3463·1	At a Mullah's house in the old city.	Sven Hedin, 3136·5 ft. Pevtzoff (Tibet Expedition, 1889–90) gives lat. 41° 43′ 7″, long. 86° 9′ 5″ for bridge over the Kara Su on the road to Shinegu.
Karashar	42 3 35·1	86 35 40·6	3471·4	Inn in the south suburb.	Sven Hedin, 3553·2 ft. Pevtzoff gives lat. 42° 3′ 0″, long. 86° 35′ 1″ for a point on the left bank of the river, 100 sashen below the ford.
*Tabalghi	42 15 13·9	86 51 18·9	3627·2	At a village inn opposite official inn.	
Turfan	42 56 1·1	89 6 3·0	97·2	In the new city.	Russian Govt. Map 1 : 1,680,000, 300 ft.
Urumchi	43 48 3·2	87 46 15·7	2736·7	Just outside the south wall of city.	Russian Govt. Map 1 : 1,680,000, 2850 ft.
*Ku-mu-ti	43 57 40·7	87 50 2·8	1910·2		
Tz'ŭ-ni-Ch'üan ...	44 11 50·0	88 29 35·4	1632·8	Village inn.	
Hami	42 48 34·9	93 18 16·2	2140·5	At the inn in the Mahommedan bazaar.	Russian Govt. Map 1 : 1,680,000, 2810 ft.
Huang-lung Kang ...	42 45 6·1	93 44 34·3	2106·9	Official inn.	
K'u-shui Yi	42 2 49·8	94 26 25·4	3140·7	Village inn.	Russian Govt. Map 1 : 1,680,000, 3380 ft.
An-hsi Chou	40 32 25·7	95 47 20·6	3410·2	Inn within the city.	
Su Chou	39 44 27·1	98 26 56·3	4604·7	Inn in east suburb.	Russian Govt. Map 1 : 1,680,000, 5000 ft.
Hei-ch'üan P'u ...	39 31 12·4	99 30 22·9	4097·4	At the inn.	Russian Govt. Map 1 : 1,680,000, 4460 ft.; French Govt. Carte de C' Asie 1 : 1,000,000, 4462 ft.
Kan-chou Fu ...	38 55 41·4	100 21 29·6	4642·5	Inn in the south suburb.	Russian Govt. Map 1 : 1,680,000, 5000 ft.; French Govt. Map 1 : 1,000,000, 5003·4 ft.
Tung-loa Fên Hsien	38 49 18·6	100 48 14·7	4726·5	Inn within city walls.	
*Shui-ch'üan P'u ...	38 22 54·9	101 40 5·8	6915·8	Village inn.	
Yung-ch'ang Hsien...	38 15 19·6	101 56 2·3	6071·4	At the inn near the east gate.	Russian Govt. Map 1 : 1,680,000, 6500 ft. French Govt. Map 1 : 1,000,000, 6479·8 ft.

Ching-pien Yi ...	37	40	50·8	102	45	8·6	5577·3	Inn within the walled village.	
Chên-ch'iang Yi ...	37	9	3·5	102	53	29·4	8583·8	Village inn.	
K'u Shui	36	15	5·4	103	25	14·3	5193·9	Inn within walled village.	
Lan-chou Fu ...	36	3	11·4	103	46	7·1	4806·8	Suburb slightly east of south gate.	Russian Govt. Map 1 : 1,680,000, 4900 ft. Kozloff, 5200 ft. Potanin gives lat. 36° 2′ 9″, long. 103° 46′ 7″ for Roman Catholic mission station in southern quarter of the town.
*Li-chia P'u	35	28	19·0	104	45	0·1	6211·1	Village inn.	
Kuoa-chia Chên ...	34	58	17·7	105	23	41·8	4195·9	Village inn.	
Ch'in Chou	34	35	34·8	105	33	45·6	3707·8	North suburb.	Kozloff, 3861 ft.
Hui Hsien	33	45	29·9	105	53	42·1	3027·8	Inn in south suburb.	French Govt. Map 1 : 1,000,000, 2526·3 ft.
Loa-yang Hsien ...	33	19	52·7	106	3	31·0	1939·1	Inside city walls.	
Chien Chou	32	0	53·7	105	43	55·2	1393·7	Inn within city walls.	War Office Map of Chinese Empire 1 : 1,000,000, 1525 ft.
Hsiao-han Chên ...	31	3	2·0	104	28	4·3	1512·6	Village inn.	
*Hsin-tu Hsien ...	30	49	31·3	104	17	38·1	1692·6	Inn within city walls (near west gate).	
Ch'êng-tu Fu ...	30	37	52·9	104	19	23·9	1734·7	At British Consulate (within city walls).	War Office Map 1 : 1,000,000, 1700 ft.; Russian Govt. Map 1 : 1,680,000, 1504 ft.
Ch'ung-ch'ing Fu ...	29	32	8·0	106	32	45·0	750·0	Height at river-bank, latitude and longitude at British Consulate.	War Office Map 1 : 1,000,000, 750 ft.; German Govt. Map, 'Karte von Ost China,' 1 : 1,000,000, 820·2 ft.; Brit. War Office Map, lat. 29° 32′ 8″, long. 106° 32′ 45″.
Ch'i-chiang Hsien ...	29	1	54·0	106	40	7·3	994·6	Inn in suburb outside the south gate.	
Sung-K'an Ch'ang ...		—			—		1226·2	Village inn.	German Govt. Map 1 : 1,000,000, 951·4 ft.
Hou-pa Ch'ang ...	27	30	14·0	107	1	28·6	2870·6	Village inn.	" " " 2690·3 ft.
Hsi-fêng Ch'ang ...		—			—		3535·1	Village inn.	" " " 4002·7 ft.
Ku-t'ung Kai ...	26	28	32·4	107	35	28·4	3678·6	At the inn.	
Pa-chai T'ing ...	26	12	28·1	107	51	58·8	3456·6	Inn within the city walls.	" " " 2821·5 ft.
*Ssŭ-lung Kai ...	25	52	3·0	109	12	58·4		Village inn.	
*Lung-shêng T'ing ...	25	48	1·6	109	30	48·5	723·7	Village inn.	
Kuei-lin Fu	25	18	0·0	110	10	7·0	506·3	In the Church Missionary Society's premises near north gate of city.	Position determined by Department of Research in Terrestrial Magnetism, Carnegie Institution of Washington, the longitude depending on chronometric observations.
Fêng-ch'ung T'ang ...	24	15	57·2	110	35	30·1	167·9	River bank.	
Wu-chou Fu... ...	23	27	21·5	111	16	6·0	20·0	On the left bank of the West River near river steamers' *p'ai*.	Same observers as at Kuei-lin Fu. British Consulate, lat. 23° 27′ 8″, long. 111° 16′ 6″
Canton	23	6	9·0	113	16	2·0	± 0	At Custom signal station opposite Shameen.	Latitude and longitude determined by British War Office.
Shek-lung	23	6	28·1	113	52	11·7	± 0	At the inn.	
Kowlun	22	18	13·2	114	10	27·9	± 0	Observatory at Kowlun.	Longitude determined by Green, U.S.N.; latitude determined by Doberck, Director of Hongkong Observatory.

Institute, and Hong-kong Observatory as given in the Nautical Almanac. Longitudes by Moon's altitude are never very trustworthy, and as the observations were only taken on one side of the meridian, no great reliance can be placed upon them in the present case. The longitude of the places obtained by this method differs from that previously assumed by Mr. Clementi from preliminary computations by amounts varying from 1′ 15″ to 9′.

From Kashgar to Loa-Yang Hsien Mr. Clementi has been fortunate enough to obtain an almost unbroken chain of chronometric differences of longitude, and the results, without any attempt at adjustment, are clearly set forth in his report, so that, if any points in this chain should be accurately determined in longitude later on, the longitude of all the others will be found by applying a constant correction.

In addition to the astronomical observations, Mr. Clementi's report gives lists of heights obtained from readings of a mercurial barometer, Watkin aneroid, and hypsometer, all of which were made by Casella & Co., and tested at Kew Observatory. The mercurial barometer was used as far as Ch'êng-tu Fu, where it was accidentally broken; but the aneroid and boiling-point readings were continued to the end of the journey. On arrival at Hongkong the aneroid was again tested and its errors tabulated. The differences of height between stations were computed by the formula given in the 'Hints to Travellers' and adjusted to Kashgar, Lan-chou Fu, Ch'êng-tu Fu, Ch'ung-ch'ing Fu, and Wu-chou Fu, which have been considered as fixed. The preceding table contains the latitudes, longitudes, and heights of about fifty of the more important places in Mr. Clementi's list, together with occasional references to previous determinations, which will be useful for comparison. The report from which they are taken, and which contains full details and complete lists, is printed at Hongkong by Noronha & Co., and entitled 'Summary of Geographical Observations taken during a Journey from Kashgar to Kowlun, 1907–9, by Cecil Clementi, M.A., F.R.G.S., Assistant Colonial Secretary, Hongkong, 1911.'

PROFESSOR PENCK ON THE SITES OF GERMAN CITIES.*

One is often struck by the far-sightedness of the founders of cities, and especially is this the case when we consider the sites chosen for the Roman cities along the courses of the Rhine and Danube. On the former we have Cologne, a bridge-town placed where the Rhine shows for the last time a high left bank before beginning to wander over its lower plain; Bonn, at its exit from the mountains; Coblenz, the strong place which guarded the passage of the Moselle; Mainz, opposite the mouth of the Main, below which the first bridge across the Rhine was built. Above, where the river again swings from side to side of its valley-floor, Roman cities avoided the course of the stream, retreating (like Strassburg on the Ill) somewhat inland, and only appearing again on its banks where these are again firm and high, as at Basel. All these, which include four of the greater cities of modern Germany, bear witness to a good eye for position, and all are placed on the left or Roman bank. On the Danube, too, we find a series of Roman cities, this time on the right bank, repeating more or less closely the

* Summary of a paper issued as vol. 5, pt. 5, of the series entitled 'Städtebauliche Vorträge aus dem Seminar für Städtebau an der Königlichen Technischen Hochschule zu Berlin.' (Berlin: Wilhelm Ernst & Sohn. 1912. Price 2 marks.)

site conditions of those on the Rhine. Thus Mainz has its counterpart in Regensburg, Coblenz in Passau, Bonn in Linz, and so on. The Danube, however, has to make its way through a greater number of defiles, one of which is still commanded by Vienna, though its ancient rival Carnuntum is represented by a village only.

Besides these Roman cities in the west and south, there is another series in the east, dating from later times, but like the former in their origin as colonies and places of defence, and in the character of their sites. On the Oder, they occupy the bank of the stream—the left—which has Germany in its rear; witness Magdeburg (on a site resembling that of Cologne), Breslau, and Frankfurt, all commanding passages of the river. Only in the extreme north-east do we find towns on the right bank, but here there was no question of the protection of a frontier. But it is not all the German cities which show equal evidence of design in the choice of their sites, and we must be careful not to attribute their importance to this factor only. Historical and political events have in many cases supplied the impulse towards growth, while the geographical, as contrasted with the purely site relations, must be also taken into account. The importance of the former is well shown by a consideration of the general distribution of the German cities, which fall naturally into certain well-marked series. One of these, including seven of the towns of over 100,000 inhabitants, follows the coast-line more or less closely, a second follows the northern margin of the central mountains, and this includes twenty out of a total of forty-three towns exceeding the same limit. A third occupies the plain of the Middle Rhine, and numbers eight first-rank cities, if Basel in Switzerland be included. Only nine first-rank cities do not fall into one or other of these groups.

The German coasts show comparatively few large cities—a fact due to the scarcity of natural harbours. One city only—Kiel—occupies a fine, roomy bay; the remaining six lie on rivers, where sea and river-borne traffic meet. Following the rule that ports push as far inland as possible, they all lie at some distance from the river mouth—too far, in fact, for modern ocean shipping, and this has caused an outer port to spring up in each case. One of these—Neufahrwasser—has actually usurped the position of the original port, Danzig, though in other cases the older port has to some extent regained its position, thanks to improvement of the navigation. Various causes explain the predominance of Hamburg over the other North German ports. It is at the mouth of the Elbe that the warm Atlantic water penetrates farthest into the mainland of Europe, while the Hinterland of the port embraces far more than the mere basin of the Elbe, thanks to physical conditions dating back to the ice age, when the northward-flowing Baltic rivers were forced to take a westward course on meeting the obstruction of the ice. This has favoured the making of transverse canals While the severe Russian tariff cuts off some of its natural sphere to the east, in the south the domain of Hamburg extends far beyond the Austrian frontier, making it more the port of Vienna than Trieste. The Baltic ports suffer both from the circuitous nature of the sea-route round Denmark, and from the obstruction by ice on the coast in winter. That Lübeck at the south-west end of the Baltic forms to some extent a counterpart of Hamburg at the south-east end of the North sea, is due to its relative accessibility to traffic coming from the west; its importance dating from a time when east-to-west communications were served far more by the Baltic than by the modern land routes. Great as is the difference between the German ports in regard to the nature of the neighbouring seas and the extent of their Hinterland, they are alike as regards the site-conditions. With the one exception of Kiel (which as a naval port can

dispense with a Hinterland), all are river-ports, all are associated with a high river-bank, and with the presence of islands favouring the passage of the rivers, so that all fall under the category of bridge-towns.

The second series of German cities is that which fringes the line of central highlands where they drop to the North German plain. A fertile soil at their foot, and mineral riches in the mountains themselves, have attracted human settlement hither, and as further north trade has hugged the coast-line, so here from the earliest times has a trade-route followed the border of the mountains. Sites for cities have been afforded firstly by the wide bays by which the lowlands run into the mountains, and which favour communication not only with all parts of the northern plain, but with the southern regions across the mountains. The typical example is Leipzig, whose position has made it a focus of land-traffic of the first rank. Cologne, in the west, owes its importance to its situation in a bay of fertile soil at the point where the west-to-east route along the foot of the Rhenish mountains crosses the Rhine, which can still be reached here by sea-going ships. The advent of railways has further contributed to its importance as a traffic centre, and the rich deposits of coal in its neighbourhood have encouraged its industrial development. The third great bay in the line of highlands, the Silesian, has somewhat different features, but here too we find, in Breslau, a city which commands the routes in all directions, though its river was long little used for navigation. It has suffered from the neighbourhood of the Russian customs-frontier, but has been to some extent compensated by the industrial development in upper Silesia. Dresden is less favourably placed in respect of the east-to-west land traffic, but this is made up for by the active water-traffic by the Elbe, both to the north and to the south.

In Hanover, Brunswick, and Magdeburg we have a trio of cities associated with spurs of the highlands, a position likewise of some advantage. Magdeburg, originally important as a border town, was subsequently favoured by its central position, and by the important highway of the Elbe. This trio has its counterpart in the west in Brussels, Lüttich, and Aachen (Aix), the two latter on a line which, when produced, leads directly to Cologne. East of the Rhine, both the highlands and the line of border cities bend to the north. Some of the cities —Duisburg, Essen, Dortmund—have been famous from of old, marking as they do stages on an ancient line of communication. But they have owed their modern development to the enormous coal-resources of the Rhine-Westphalian region, which have also called into being a host of newer centres, the whole forming a complex which promises to become one huge city, and can already show a population of 2,000,000. Whereas the older centres lay to the south, where the coal could be worked at a moderate depth, the newer have been pushed more and more to the north in proportion as modern methods have permitted deeper working of the northward-dipping seams. Side by side with this colliery district, the neighbouring industrial district round Elberfeld-Barmen has advanced in prosperity. Farther east, on the northern slopes of the Erzgebirge and the Vogtland, similar conditions recur round the Saxon cities of Chemnitz and Plauen. East of Dresden, however, the border towns have shown no such striking growth. In Silesia, the town which approaches nearest to Breslau—Görlitz—occupies a position recalling that of Hanover.

The third series is formed by the cities of the Middle Rhine. Here, from Basel to Mainz, we find a fertile plain stretching like a garden between highlands on either side, blessed with a mild climate which attracts settlers in greater numbers than are to be found elsewhere in southern Germany. The old importance of the valley as a line of communication between north and south has been

heightened since the advent of the railway. At the northern end, the position of Mainz for centuries gave it a leading place among the commercial centres of southern Germany, and that it has lost this may be ascribed in part at least to the fact that it lies on the left bank of the Rhine, so that, with the eastward growth of Germany, a formidable rival arose on the right side of the stream in Frankfurt on Main, which commands a natural route to the north and north-east, while also sharing in the use of that to the north-west by the Rhine. It found a second rival in Mannheim, higher up the Rhine, the head of greater navigation on the river, and the great port for Württemberg and Baden, Switzerland, and Alsace-Lorraine. With Wiesbaden, Offenbach and Darmstadt, we have here a complex of cities with a total population of 700,000. Strassburg, though not actually on the main stream, has always dominated the centre of the Rhine plain as the main focus of land traffic, its site enabling it to command not only the narrow pass on the side of the Rhine, but the gate of the route towards Paris. Its counterpart on the right-bank of the Rhine is Karlsruhe. Lastly, commanding the two southern exits from the valley, we find Basel and Mülhausen, though neither of these has reached a development approaching that of Frankfurt at the northern end.

The remaining first-rank cities of Germany, scattered over the rest of the surface, represent only a fifth of the whole. They occur both in the upland region and on the plains, in the former case preferring a central position in the basins into which the whole is divided. Examples of these are, in the south, Stuttgart, Nürnberg, and Würzburg (though the last has not yet reached the limit of 100,000 inhabitants); and in the centre, Cassel and Erfurt. Four first-rank cities belong to the plains, viz. Munich and Augsburg in the south, Posen and Berlin in the north. Whereas the cities of the coast and upland border are too near together in the west to allow room for large cities between, in the east the two series diverge, leaving room for Posen between Danzig and Breslau, Berlin between Stettin and Dresden or Leipzig. In no case is the importance of geographical position more evident than in that of Berlin. Much was no doubt due to the transference thither of the seat of government of the Kurfürsten of Brandenburg, but the future expansion of that state was intimately bound up with the favourable position of Berlin. It possessed the great advantage of easy communication by water in all directions. Both the Havel and the Spree could be connected with the Elbe and the Oder, with the result that two diagonal lines were provided—from Magdeburg to Stettin, and from Breslau to Hamburg—crossing quite close to Berlin. A water connection was also possible with the Vistula, and so with the ancient possessions of the Hohenzollerns in Prussia. When railways came, they could with equal ease be carried in all directions, making Berlin the most important railway centre in the Empire, though not by any means placed centrally in the latter. Leipzig possessed a certain additional advantage of position, making it the rival of Berlin as the chief market for German industrial products. In the immediate neighbourhood of the capital, other centres, *e.g.* Köpenick and Spandau, are quite as favourably placed, which shows how much after all Berlin owes to historical accidents in the past.

To sum up, twenty-nine of the forty-three German cities under review are bridge-towns, including almost all the ports, half of the upland border series, the majority of the Middle Rhine cities, and all of the scattered class. The close relation of the cities to the great lines of communication is thus brought out, and still more does a consideration of their geographical situation emphasize their dependence on commercial activity.

REVIEWS.

EUROPE.

'Transport Facilities in the Mining and Industrial Districts of South Wales and Monmouthshire.' By Clarence S. Howells. (London: King. 1911. Pp. 56. 2*s*.) This study of communications in South Wales was written as part of a thesis in the University of Wales, and is issued as one of the publications of the Department of Economic and Political Science in the University College at Cardiff. Before entering into close detail concerning the various facilities for transport, there is a brief topographical notice of the area dealt with, and the relation of communications with its surface features is studied.

'Tramps through the Tyrol.' By Frederick Wolcott. (London: Mills & Boon. 1912. Pp. x., 298. *Map and Illustrations.* 7*s*. 6*d*.) No part of Europe lends itself more readily than Tirol to treatment on the lines of the descriptive travel-book in which scenery, people, history, and legend form the principal headings for the subjects. This is a good book of its type, and is excellently produced, with a fine Austrian map of the district, a number of photographs, and some of the almost inevitable coloured reproductions; these, however, are somewhat above the ordinary standard, and there are also some sketches in half-tone. The book should merit the attention of those who are to travel in Tirol.

'Russia.' By Sir Donald Mackenzie Wallace. (London: Cassell. 1912. Pp. x., 788. *Maps.* 12*s*. 6*d*.) This important volume appears as a revised edition of the author's work first published in 1877, but it is only so in so far as it retains the matter of permanent value from the original issue. It has been in great part rewritten, and much entirely new matter has been added. Its interest is mainly political and social. As a book for the general reader its attraction is greatly enhanced by the narrative of many of the author's personal experiences. Its geographical interest centres mainly in the new study of industrial conditions, and in the two maps, on which Mr. Bartholomew shows excellently the distribution of population and the zones of vegetation and cultivation, together with mineral products. These two maps, though separated by more than 400 pages of text, can be conveniently studied side by side, and may be so with profit.

ASIA.

The Indian North-West Frontier.

'From the Black Mountain to Waziristan.' By Colonel H. C. Wylly, C.B., with an Introduction by Lieut.-General Sir H. L. Smith Dorrien, K.C.B. London: Macmillan. 1912. *Maps.* 10*s*. 6*d*. *net*.

This book has been compiled to meet the want of officers who may be called upon for service among the Trans-frontier tribes across the north-western border of India. The author himself illustrates the practical need of such a work by a reference to his own experience in 1897, when his battalion was called upon to join the expedition to Tirah, and only one or two of the officers had ever been west of the Indus, while the only available storehouse of information was Paget and Mason's heavy work, 'Expeditions against the North-West Frontier Tribes,' much of which was ancient history. Moreover, it was labelled, after the haphazard fashion so often prevalent, "Confidential," so the very officers for whose special behalf it was prepared were rigidly debarred from using it. The present work gives concise accounts of the chief expeditions during the last sixty years in

a far more convenient form than Paget's book, besides possessing the advantage of being brought up to date.

Burma.

'Une Colonie modèle. La Birmanie sous le Régime britannique.' Par Joseph Dautremer. Paris: Guilmoto. 1912. 6 *francs*.

Technically, of course, Burma is not a colony, but a province of the Indian Empire, and geographically it can hardly be regarded even as a part of Hindostan. Nevertheless it has for years been considered by Anglo-Indians as quite a show specimen of successful administration, and the extent to which its resources have been drained for contributions to the so-called Imperial requirements of the Government of India has earned for Burma the *sobriquet* of the "milch cow of British India." It is flattering to our national vanity, no doubt, to find these fruits of our rule held up for general admiration, but, candidly, the compliment is well deserved, and M. Dautremer's experience as French consul for four years at Rangoon has officially qualified him to deal with the varied aspects of Burmese administration, while his former works, 'L'Empire Japonais et sa vie Economique,' and 'La Grande Artère de la China: le Yang-tseu,' have proved him to be an Oriental writer of experience and accuracy. The present work is dedicated to Sir Harvey Adamson, to whom the author expresses his indebtedness for all the latest statistics and other information which enables the book to be regarded as an exhaustive provincial monograph, well worthy, in our opinion, of translation into our own tongue, for the benefit of British readers interested in Eastern India.

'The Chinese.' By John Stewart Thompson. (London: T. Werner Laurie. *Not dated*. Pp. vi., 440. *Maps and Illustrations*. 12*s*. 6*d*.) The first ninety-six pages of this work consists of pleasantly written impressions of the colonies of Hong-Kong and Macao; the rest is a rather discursive attempt to survey Chinese national life under various aspects. The book thus falls into two parts. The former of these is easy reading and informative; one feels, however, that the latter portion is rather too ambitious, while the personal note which lends interest to the former is almost entirely absent. The illustrations are of uniform excellence, but in most cases have no relation to the text.

AFRICA.

The Western Sudan.

'Notes on some Languages of Western Sudan' . . . By P. Askell Benton, B.A. Henry Frowde, London, New York, etc. 1912. 7*s*. 6*d*. *net*.

As the full title of this book states, Mr. Askell Benton, who is Assistant Resident of the province of Bornu, Nigeria, prints for the first time twenty-four vocabularies made by Dr. Barth during his famous journey in the Western Sudan some sixty years since. Mr. Benton is himself a student of West African languages, and he gives us as the result of his own investigations valuable notes (with vocabulary) on Bolanchi, the tongue (allied to but distinct from Hausa) spoken by the Borlawa of the Fika district, Bornu. He has also drawn up some tentative notes on Budduma, the language of the Lake Chad islanders, giving with it most of the information available concerning those people, who—secure in their island homes—maintained their independence against the forces of Bornu and Wadai (Kanem). These linguistic researches of Mr. Benton are valuable, but they have not the importance of his discovery of Barth's unpublished

vocabularies. Dated Kuka, October 10, 1852, Barth sent them to England in the hope of immediate publication, but they got pigeon-holed in the Public Record Office among the Foreign Office correspondence relating to Tripoli, where Mr. Benton had the satisfaction of discovering them. Other unpublished vocabularies of Barth and some made by Nachtigal are, we are informed, in the possession of Herr Rudolf Prietze, a nephew of Nachtigal, and it is hoped that he will shortly let them see the light. In a country like Nigeria, where such a multiplicity of languages and idioms are spoken, it will be a great advantage to officials and travellers to be able to study Barth's vocabularies. Their value to the student need not be emphasized.

The interest of Mr. Benton's book is not wholly philological. To many readers its attraction will consist in the extracts given from correspondence relating to expeditions of Richardson, Barth, Overweg, and Vogel, much of it now printed for the first time. With marked perseverance and enthusiasm the author has searched out from the Public Record Office, from the archives of our own Society, and from other sources, many missing links in the story of the great Central African expedition of the fifties. The reader is assumed to have a general knowledge of and an interest in the doings of Barth and his companions. This granted, he will find the missing links in the story now supplied by Mr. Benton of very great interest. We see once again the Tripoli consulate when it was the starting-point for all travellers to the central and western Sudan; we get an insight into the characters of Richardson, Barth, and Overweg not previously attainable, and note how strenuously the Shehu of Bornu sought to open up relations with England. Light is thrown too on the irritation and suspicion produced by the fact that Barth, Overweg, and Vogel, though acting for Great Britain, were all German savants; in short, the human side of a great achievement is clearly brought out. Both Richardson and Barth stand the test of this examination well; we close the book liking them all the better because we have seen them in their private life and letters.

In form the book is but a collection of notes and documents; there is no clear separation of the philological and narrative parts. It is a quarry to which the historian will go for material. For having made this material accessible our thanks are due to Mr. Benton. His official position in Nigeria, the zeal he has shown in making himself acquainted with the history, the peoples, and the languages of Bornu, enable him to illumine these sixty-year-old stories by the light of recent events. One feels, too, that under the guidance of such officials as Mr. Hewby, the Resident of Bornu, and Mr. Benton, that ancient country has a better chance of attaining true prosperity than it had under the Shakh Amr, "the resplendent among the magnanimous, the most Precious, the Light of his people, the Glory of the empire," with whom Barth concluded his treaty in 1852.

F. R. C.

The Congo Route to Lake Chad.

'De Bordeaux au Tchad par Brazzaville.' Paris: Société française d'imprimerie et de librairie. 1911.

Captain Deschamps here recounts at length his experiences of 1907 in travelling from Bordeaux to Lake Chad. The route followed was naturally round about, being by way of the Canaries and the usual stopping-places along the west coast of Africa as far as the mouth of the Congo, where the steamer ascended the great river to Boma. On reaching Brazzaville, Captain Deschamps and his companion embarked in one of the smaller steamers of the Compagnie des Messageries Fluviales du Congo as far as Fort de Possel, on the Ubangi river.

From that point the route lay across the watershed of the Congo into the basin of the Shari. Near Lake Chad the author was very soon involved in hostilities with some refractory native tribes, the details of which form here and there exciting reading. The great length of the route from Bordeaux to Lake Chad, spread as it was over a period of five months, furnishes an intelligible explanation of the various French projects which come to the front from time to time for shortening the access to those regions by constructing a trans-Sahara railway from Algiers southwards to the Chad region. Whether any such project will materialize or not it is difficult to say, but the result of the latest survey has tended, so we believe, to demonstrate its entire practicability. A word of commendation is due for the illustrations in the present book. The maps, on the other hand, are meagre and unsatisfying.

AMERICA.

South American Forests.

'In the Amazon Jungle.' By Algot Lange. London, etc.: G. P. Putnam's Sons. 1912. Pp. xx., 406. 10*s.* 6*d. net.*

In 'In the Amazon Jungle' Mr. Lange adds a bright and graphic account to the too-scanty literature about South American forests. It is one of the best pen-pictures of existence on an upper Amazon tributary that I have met with; and it is safe to say that the perusal of the conditions of town life in this annually inundated region is not in the least likely to attract the reader to a more practical acquaintance with its disabilities. What Mr. Lange so vividly describes may be experienced throughout the whole river-interior of Brazil, with but little variance of scenery or conditions; and like other "barracões" at the extreme limit of rubber industry, or within it for that matter, a few miles from river brings the traveller to the edge of the unknown.

It would be interesting to know the fate of the anaconda skin, or to have seen its photograph. If it has found its way to a New York museum, it affords a remarkably concrete reply to those armchair naturalists who cherish an unscientific denial of the possibility of such huge denizens of the South American swamps. It seems to have been rather easily dispatched, as I have found these reptiles very tenacious of life, and have always heard a similar account. The habit of coiling into a huge pyramid on a sandbank is moreover new to me; for this essentially water-snake is usually encountered, when out of its natural habitat, extended and immovable, or following, with a peculiarly horrible movement, its well-worn night track from swamp or river.

Mr. Lange was befriended by one of those small tribes of wild Indians which hover somewhat precariously upon the edge of rubber exploitation, the prey of the unscrupulous rubber-hunter from the one side, and hemmed in on the other by the inviolable limits of tribal territory. The series of adventures leading to this *dénouement* are sufficiently exciting to please the most exacting reader, and bear out the old adage that truth is stranger than fiction. That generally employed means of tribal communication, the "musical telegraph," is described, the penetrating sounds of which, in spite of the densest forest, suggests more inquiry. In some points of his later story Mr. Lange may not appear very convincing to practical forest travellers. For instance, 150 miles, including 120 "into the absolutely unknown," in nine days suggests unusually clear forest. My own experiences of similar virgin forest, not very far distant from the same locality, hold 1½ leagues a day as a supremely happy effort, and we have averaged, in not very bad forest, half a league a day for a month. Distances unmeasured by instruments are apt to magnify themselves in the most extraordinary way.

The seemingly unnecessary separation of a party of six in country peopled by hostile Indians; the advent in camp of a wild Indian, constitutionally suspicious as they all are of strangers; the unusually rapid development and fatal termination of beri-beri; the prolific character of the poisonous "jararaca," a long thin snake, which I have hitherto met only on land, and then fortunately not very numerous; the attack and destruction of the Peruvian "caboclos," whose forest life has endowed them in my experience with very nearly as keen instincts as the wild Indian; all this is a little unconvincing to those who have lived in the forest; and yet he would be a rash man who condemned it as impossible. Indeed, allowing for minor errors, a certain picturesqueness of expression, and the very real hardships of forest travel, it carries an air of truth.

Geographically, Mr. Lange makes no pretence of elucidating problems. He finds certain tributaries do not follow their supposed courses, but without instrumental check such contentions are difficult to establish. Few indeed of the lesser tributaries have been even roughly mapped, and the courses of many have only been guessed, or recorded from the erratic data of rubber proprietors. Mr. Lange, however, seems to possess the temperament of the explorer, and might turn it to valuable account. He has, I believe, returned to the scene of his adventures, possibly to gather the "golden nodules." He has written a most readable and interesting book, and withal well illustrated. Those who read it will lay it down with the hope of meeting yet more from his fluent pen.

P. H. Fawcett.

The Last Inca Capital.

'Vitcos, the Last Inca Capital.' By Hiram Bingham. Reprinted from the *Proceedings of the American Antiquarian Society* for April, 1912. Worcester, Mass. 1912.

The mountainous district of Vilcabamba to the north of Cuzco has the profound ravine of the Apurimac to the west, the lovely valley of Vilcamayu (Urubamba) to the east, and the illimitable montaña to the north. It is alike one of the most interesting and one of the least-known parts of Peru. For it was here that the Incas finally took refuge, and retained independence for thirty-five years after the fall of Cuzco. It was known that they built a palace and temple in those inaccessible wilds, and maintained some semblance of a court.

There were brief notices of the events during those thirty-five years in the chronicles of the old Spanish writers, especially in that of Calancha, a scarce work which we have in our library. But quite recently more narratives have come to light with fuller details, and the mention of several names of places. There is the account of his father's murder by the Inca Titu Cusi himself, the full report of his mission by Rodriguez, and the story of the final conquest of Vilcabamba by the Captain Ocampo, also the version of Friar Gabriel de Oviedo.

Prof. Hiram Bingham was struck with the importance, both from a geographical and a historical point of view, of exploring this deeply interesting region. After a careful study of all the existing materials, he, as leader of the Yale Peruvian expedition, undertook a journey to Vilcabamba. His geographical results are important, because they will enable him to describe this remarkable knot of lofty mountains, their valleys, alps, and snowy peaks for the first time, as well as the grand approaches from the two great rivers, and the northerly slopes into the montaña. Prof. Bingham has also taken great pains in identifying localities, and inquiring after names of places, to reconcile existing topography with the accounts and names of the early writers, more

especially as regards Vitcos, the last capital of the Incas. He has done valuable service both to geography and to history.

C. R. M.

'Place Names: Quebec, Thousand Islands and Northern Canada.' By James White. (Ninth Report of the Geographical Board of Canada. 1910. Part II. Pp. 153–455. *Maps.*) We have recently noticed a volume on the place-names of British Columbia, and it is well that this work has been carried into other parts of Canada before it ceases to be possible to recover any record of the origin of place-names. Mr. James White points out that he first undertook the work in 1905 during his tenure of office as Chief Geographer. In dealing with the names in Northern Canada, occasion is taken to furnish the personnel of the principal Arctic journeys between 1576 and 1910.

'Venezuela.' By L. V. Dalton. (London: Fisher Unwin. 1912. Pp. 320. *Map and Illustrations.* 10*s.* 6*d.*)| This volume is well up to the standard of the South American Series to which it belongs, and its author gives greater prominence than some other writers in the series to the geographical and physical introduction, in which the well-marked natural divisions of the country are clearly brought out. The lines along which economic development might proceed are demonstrated, and the present economic position is illustrated in ample statistical tables in the appendix, which also contains a full bibliography. It is pointed out in the text that the present official survey of the country has as yet covered little ground, and it is therefore satisfactory to find in this volume a large map which, though rough, embodies the results of the author's own researches.

AUSTRALASIA AND PACIFIC ISLANDS.

The British Expedition to New Guinea.

'Pygmies and Papuans: The Stone Age To-day in Dutch New Guinea.' By A. F. R. Wollaston. London: Smith, Elder & Co. 1912. Pp. xxiv., 345. *Maps and Illustrations.* 15*s. net.*

This important book is a great addition to the now rapidly accumulating records of the strenuous efforts which, though only in recent years, have been made to explore the slopes and reach the summits of the great Snow Mountains of New Guinea. Since the Dutch navigator, Jan Carstensz, first saw them in the year 1623, nearly three centuries ago, the very existence of these mountains has sometimes been almost doubted, and the old yarn that their tops were snow-capped has been the subject of even greater incredulity. For one thing, they lie in the absolutely unexplored country stretching back from the least-known part of the coast of little-known Dutch New Guinea; and, for another, the country which intervenes between the sea and these mountains was believed, rightly enough as it now appears, to be as desolate and inhospitable a tree-covered swamp as exists in the known world, and was understood to be inhabited, very sparsely, only by natives in a state of culture so primitive as to make it probable that communication with them would be very difficult.

But as the unknown parts of the world become few, the attraction exercised even by the most inhospitable of these few on the explorer, especially the scientific explorer, becomes proportionately greater. Moreover, the extraordinary character of the flora and fauna found in the better-known parts of New Guinea had raised very great expectations as to what might still be found in these till lately quite untrodden wilds of the Dutch part of "the Great Island."

In the *Geographical Journal* for May, 1911, Dr. H. A. Lorentz gave a very vivid and thrilling account of how he, a Dutchman, in November, 1909, reached

the actual snow-line of this Dutch-owned mountain range, at Wilhelmina peak, from the North river; and even while Lorentz was accomplishing this feat, an English expedition was struggling up the Mimika river in a bold and very arduous effort to reach another of these snow-capped peaks—the very one which, as is supposed, Jan Carstensz saw in 1623.

This English expedition eventually failed in its main object, and had to return by the way on which it had gone, though not till after it had traversed much new country and had made large and extraordinarily interesting collections, and—certainly the most important of its achievements—had discovered and had some intercourse with a before unknown race of men, the Pygmies, living in the very primitive conditions which we are wont to attribute to the stone age.

Unlike the Dutch expedition led by Lorentz, the English expedition, under the leadership first of Mr. Walter Goodfellow, and, after that gentleman had been driven back by ill health, by Captain C. E. Rawling, was a first attempt to attain its particular object; and its partial failure seems to have been due to mistakes in the preliminary arrangements, mistakes which may very fairly be set down to misunderstanding of the particular conditions likely to be met with.

Captain Rawling, who was more especially the representative of the Royal Geographical Society on the expedition, and who, after the retirement of Mr. Goodfellow, assumed the leadership, has given a very clear but necessarily brief account of the incidents of the journey in the *Journal* for September, 1911; and the same writer has materially added to this, at any rate as regards geographical detail, in the *Journal* for the December following. Mr. Wollaston, who from the first was attached to the expedition as medical officer, entomologist, and botanist, was entrusted by the British Ornithologists' Union—the whole undertaking was planned and organized by this Union, in celebration of its own fiftieth anniversary—with the important duty of writing the official account of what happened and what was seen during the expedition.* The result is the book now under notice; and if from one point of view the book may be regarded as the record of a failure, it tells at least of a splendid failure and one due to no fault, no lack of effort, on the part of those who were concerned in it, and splendid in the great mass of information as to the remarkable people and the natural history of the district which was accumulated.

Incidentally, the three chapters at the end of the book, by Mr. Ogilvie Grant (on the birds collected), by Dr. A. C. Haddon (on the Pygmies), and by Mr. Sidney Ray (on the language question), should be noted as very important.

But to the present writer the most satisfactory of all the thoughts suggested by perusal of the book is one of great satisfaction that its author, Mr. Wollaston, has now gone once more to New Guinea, to attack the Snow Mountains again, and with the most favourable prospects of success this time, invincibly armed, as he may be almost certainly assumed to be, by the experience and knowledge which he gained last time and has recorded in this very interesting book.

E. IM T.

German New Guinea.

'Kaiser-Wilhelms-Land: Beobachtungen und Erlebnisse in den Urwäldern Neuguineas.' By Dr. Eugen Werner. *Illustrations and Map.* London: B. Herder. 1911. 7*s*.

The literature of New Guinea is now rapidly growing, and if—as the writer of the book now under review says—the time has not yet come for a complete

* A second narrative, by Captain Rawling, will shortly be published.

monograph on this subject, and the material is not yet adequately gathered in, yet that time is being rapidly brought nearer by the many books on individual aspects of the great island which are being published. To these books Dr. Eugen Werner has added yet another, and a good one. After serving for a time as an official of the German New Guinea Company, and after having subsequently undertaken a good deal of independent personal investigation among the natives, Dr. Werner here tells us in an interesting way what he saw of the natives and of nature in the damp mountain forests of the interior of German New Guinea.

In order to bring his book into line with the series to which it belongs, Dr. Werner has in the first place given a short general review of the results of the exploration of white men in the region with which he was concerned, and has then given an account of his own experience among the natives and as an investigator of the natural history of German New Guinea. The book teems with interesting notes which should one day find place in the desired general account of the island, and a fairly good index gives opportunity for arranging these notes in something like systematic order.

The illustrations are many and for the most part good; but there are a few which are tantalizing in that they give too indefinite a representation of the intended object; for instance, the picture on page 30 which is intended to represent one of the countless moss-swathed leaves which give the chief phanerogamic aspect to the supersaturated mountain forests of New Guinea—and other similar areas—is quite inadequate for its purpose.

As usual in German books on German New Guinea, there is little or no account of official developments in the coast region, but probably no such information is to be expected at present.

E. IM T.

'Coalfields and Collieries of Australia.' By F. Danvers Power. (London: Critchley Parker. 1912. Pp. xiii., 412. *Illustrations.* 25*s.*) The great importance which will probably be attached in the near future to the Australian coalfields makes it a matter for congratulation that this detailed study of their present condition has been put forward. The study is for the most part highly technical, dealing with the quality and varieties of coal obtained, and the methods of working. Six chapters are devoted to the various fields arranged topographically according to the principal divisions of the Commonwealth.

'New South Wales.' Edited by Prof. T. W. E. David. (Melbourne: Whitcombe & Tombs. 1912. Pp. xii. 372. *Illustrations and Maps.* 4*s.* 6*d.*) Prof. David has edited in this volume contributions by Mr. Griffiths Taylor, Mr. A. W. Jose, and Dr. Woolnough. In its main lines this is a geographical study in the best sense. We find first the situation, exploration, settlement, and native population of the territory considered; next, its physical geography in every department; and lastly, its economic and political geography. In the last connection the particularly interesting chapter on water-supply in relation to the settlement may be mentioned in illustration of the manner in which geographical control is kept constantly in view by all three writers. There are copious illustrations, including a number of clear maps and diagrams illustrating special points.

'Problems of the Pacific.' By Frank Fox. (London: Williams & Norgate. 1912. Pp. 294. 7*s.* 6*d.*) We have here a political study of the Pacific, a problem of political geography of which the working out is beginning to gather

momentum and may soon proceed very rapidly. The solution is taken to lie mainly in the hands of this country, the United States, Japan, and China, for the last is believed to show possibilities of becoming the greatest single force in the Pacific. Not only these nations, but others which are concerned in the affairs of the Pacific, are studied in this volume by a writer who has a close acquaintance with all their various interests. The Panama canal, the opening of which is the leading incident which can be foreseen in the future of the problem, of course claims a chapter, and industrial conditions fill an important space, while in connection with these and strategical considerations there is an interesting sketch-map showing trade routes and cable lines, and also naval and coaling stations either in existence or to be established.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Earth History and Morphology.

'The work of Rain and Rivers.' (Cambridge Manuals of Science and Literature.) By Dr. G. Bonney. Cambridge: University Press. 1912. Pp. 144. *Illustrations.* 1*s.*

'The Making of the Earth.' (Home University Library.) By Prof. J. W. Gregory. London: Williams & Norgate. 1912. Pp. viii., 256. *Illustrations and Maps.* 1*s.*

The various series of small handbooks which are now appearing have given many good opportunities to first-rate authorities to place a summary of their knowledge before the public in a readily intelligible form, and the two writers of the small volumes under notice have done their respective texts admirably. From the volumes in these two series which have already come under notice, it would appear that the Home University series aims at dealing mainly with broad general subjects, whereas the Cambridge series is concerned rather with special branches of those subjects. Prof. Gregory deals with the origin of the Earth, the formation of its surface and its plan, together with that division which geographers have termed the "biosphere." He has thus to touch the fringe of many problems, while Dr. Bonney has had to deal with only a few. In studying the work of rain and rivers the latter writer has drawn freely on his personal observations, and his book generally could hardly be improved as an introduction to the subject of land-sculpture, presented in language of peculiarly admirable choice. Both books are welcome to the geographical student on the physical side.

GENERAL.

'Knowledge of the World.' With notes by Marcus Jimenez de la Espada. Edited and translated by Sir Clements Markham. (London: Hakluyt Society. Series II., vol. 29. 1912. Pp. xiii., 85, xxxvi. *Illustrations.*) The "book of the knowledge of all the kingdoms, lands, and lordships that are in the world . . . written by a Spanish Franciscan in the middle of the fourteenth century," is here translated and edited by Sir Clements Markham, who has added a list of the names of places mentioned, classified under the countries to which they belong, together with a key for their transliteration, and a full index; the text, moreover, is carefully annotated and has been made easy to follow. The arms and devices which it was part of the author's object to illustrate are reproduced very effectively, and the volume is a valuable addition to the Hakluyt series.

'Geographie des Welthandels und Weltverkehrs.' By Dr. Ernest Friedrich. (Jena: Fischer. 1911. Pp. viii., 429. *Maps.* 11*m.*) This commercial geography will be found of more than usual interest to British students, as it is based in

considerable part on Prof. Herbertson's 'Division of the World into Natural Regions.' A good coloured regional map is provided among other maps, which show fairly clearly, though on a rather inadequate scale, the distribution of certain important commodities. The text is divided into two parts: the first dealing in general terms with natural products and world commerce, and the geographical factors involved in their consideration. The second part, amounting to two-thirds of the whole book, deals with the trade of the principal divisions of the world according to continents; but at the same time seeks to establish parallels between the natural regions in the different quarters of the Earth. In this part a considerable amount of the information is given in tabular form, and a notable feature is a copious list of references to authoritative sources of information. The book appears thorough, but it makes rather heavy reading.

'Secrets of the Pacific.' By C. Reginald Enock. (London: Fisher Unwin. 1912. Pp. 359. *Illustrations and Maps.* 12*s.* 6*d.*) Mr. Enock in this volume turns his versatile attention to the difficult subject of the lost races of the Pacific islands and America. He has studied the various views which have been expressed as to the routes by which migration took place in this hemisphere long before the late dawn of its history, and though such inquiries have led to little or nothing in the way of definite conclusion, not a few interesting suggestions are made here, and the fascination of the subject for the author is reflected in the style of the book.

THE MONTHLY RECORD.

EUROPE.

Glaciation in the Black Combe District, Cumberland.—From its position between the Lake District mountains and the Irish sea, both of which had their own ice-covering in the Glacial epoch, the district of Black Combe presents excellent opportunities for a study of the effects of former glaciation on existing features. The subject has been discussed by various geologists in the past, but little had been written of late upon the Black Combe area until the present year, when, on March 17, Mr. Bernard Smith gave a paper thereon before the Geological Society. This has been printed, with maps and plates, in the *Quarterly Journal* of that Society, vol. 68, Part 3, September 12, 1912. The district consists of (1) the Duddon valley and estuary, (2) the mountains between that and the plain, (3) the low coastal plain at the foot of the mountains. In the two former the effect of the ice-conditions has been merely to modify pre-existing topography, whereas the plain is almost entirely composed of thick drift deposits. The mountain country consists chiefly of "Skiddaw" slate, volcanic rocks, and granite. Apart from the plain, the main features of the district had been already developed before the Ice Age, and the main pre-glacial drainage lines resembled the present; but, as a result of the glaciation, some of the features were accentuated, some subdued, and some new ones were introduced. The direction of movement of the ice at the time of the maximum glaciation is shown chiefly by (*a*) the composition and distribution of the drifts; (*b*) the erratics; (*c*) the grooved, smoothed, and moutonné surfaces, seen to perfection in the volcanic tract. The whole district appears to have been completely overridden by an ice-sheet formed by the confluence of the edge of the Lake District ice-cap with the great Irish sea glacier, even the top of Black Combe being covered. The Lake District ice moved from

three main directions—the Broughton valley; the Duddon valley and the high ground on the west; and Eskdale. That from the last-named joined the fringe of the Irish sea ice, and became in time merged with it. This sea-ice was forced into the mouths of the Whicham and Duddon valleys, and, having incorporated the ice from these, passed across parts of Furness and Morecambe bay. That such was the general course of the movements is proved by a study of the drifts left behind, into which the author enters in considerable detail. The phenomena which occurred during the retreat of the ice have a special interest from their bearing on existing topography, and among them special attention is paid by the author to a remarkable series of marginal channels, running at right angles to the general direction of the drainage, and now for the most part dry or occupied by insignificant streamlets. Their trend corresponds more or less with that of the moraines on the hillsides, and they seem to have been either carriers of the marginal drainage of the ice-sheet (now in the ice, now in the rock, or between the two), or channels scoured out by overflow waters from lakelets held up between the ice-front and embayments of the land. As the ice-front shifted, new channels were developed, forming parallel series at different levels. Some striking examples of these are illustrated from photographs. Other features, of which evidences are still to be seen, were valley lakes held up by lobes of the ice. Corrie-glaciers lingered in sheltered combes at a late stage, a typical example being supplied by Black Combe itself, which also shows several instances of hanging valleys. These are attributed to over-steepening of hill-slopes or over-deepening of valleys by glacial action, though it may be noted that in one case at least the actual steepening agent is considered to be the flowing water held by ice against a slope.

Former Glaciation in Northern Spain.—Prof. W. Halbfass, who has been travelling in Spain during the past summer for the sake of limnological investigations, writes to *Petermanns Mitteilungen* (October, 1912, p. 216) stating that, in company with Herr Olbrich, a former pupil of Richthofen's, he has been able to substantiate the existence of traces of a former extensive glaciation, which certainly date from a relatively recent period. They were found in the province of Zamora in the region of Lake Castañeda, a lateral moraine to the south of which was of so typical and well-marked a character as is hardly exceeded even in the Alps.

Russian Canal Schemes.—It is stated in *Export* (1912, No. 40) that the long-talked-of scheme for a canal to open through communication between the Black sea and Baltic by linking the systems of the Dneipr and Duna seems now in a way to be realized. It is said that the necessary capital of 450 million roubles (47½ million pounds) will be supplied by a foreign company, and that official permission for the commencement of operations will at once be given. Some account of the scheme as then under discussion, as well as previous schemes with the same object, was given in a Foreign Office report by Mr. Consul Woodhouse in 1900 (Misc. Ser., No. 529; see also *Journal*, vol. 16, p. 555). Great hopes are entertained of the commercial development likely to ensue from the making of the canal, which will open up an important route for the export not only of Russian corn, but of timber, ores, petroleum, etc., as well as for the import of coal. It is pointed out that the railway freight across Russia is at present some 20 kopeks per pood, to which some 4 or 5 kopeks must be added as sea-freight to Hamburg or England; that the southern sea-route from Odessa involves a freight of 7 or 8 kopeks, with an additional sum of anything up to 6 kopeks for railway transport to Odessa; whereas the freight from Kherson to Riga is reckoned at only 3 to 5 kopeks per pood by the canal now to

be constructed. Another important scheme lately put forward is for a canal to open communication between Central Russia and Siberia by linking the systems of the Volga and Obi-Irtish. According to information given in the *Times* Engineering Supplement for September 18 last, the proposed route will make use of the Chusov (apparently the Chusovaia) and a tributary, on the west of the water-parting; and the Reshotka, Isset, and Tobol on the east, thus entering the Irtish close to Tobolsk. The length is 1100 miles, and the waterway is designed to take vessels of 5½ feet draught and a length of 350 feet. The general question of the development of Siberian waterways will shortly, it is said, be investigated on the spot by a Commission of Engineers.

ASIA.

Prof. Musil's Latest Expedition in Arabia.—During a four months' trip made from Damascus in company with Prince Sixtus of Parma, Prof. Musil has this year traversed further unexplored or little-known districts of northern Arabia and Mesopotamia. He is said to have examined a large number of antiquarian remains, and to have come upon isolated Jewish colonies whose people have completely adapted themselves to the ways of the surrounding Mohammedans.

First Steamer on the Middle Hwang-ho.—According to a communication printed in the *Missions en Chine*, etc., October, 1912, the middle course of the Hwang-ho was last summer for the first time navigated by a steamer. It is a stern-wheeler flying the Belgian flag, built at Hoboken for Mr. Alphonse Splingaerd, eldest son of the well-known Paul Splingaerd who accompanied the first Belgian missionaries to Mongolia in 1865. Its owner's idea is to investigate the possibility of towing the large numbers of boats which ply on the Hwang-ho as far as Kansu, and bring down the commodities of that province and of Mongolia to the cities on the lower part of the river.

Boundary Delimitation in Borneo.—Information from a Dutch source is printed in the October number of *Petermanns Mitteilungen*, respecting surveys along the boundary between British North Borneo and the adjoining Dutch territory, which have been carried out by a party under Captain P. van Graderen Stort, sent by the Dutch authorities to undertake the delimitation of the frontier in conjunction with an English commission. Although the general course of the boundary was laid down by agreement in 1891, no steps had hitherto been taken to mark the line on the spot. The Dutch commission reached Tanjong Selor on May 21, 1912, and continued its journey towards Pelaja. Its work appears to have hitherto lain in the basins of the Sembakung and Simengaris rivers, of which parts are inhabited by people of Tidung stock, while their middle and upper courses fall within the habitat of the Tingala Dayaks. It is not stated whether the British commission had begun operations at the same time.

AFRICA.

West African Frontiers.—Two of the recent frontier delimitations in West Africa have resulted in slight modifications of the lines laid down by the original agreements concluded in Europe. In the case of Sierra Leone, the eastern frontier of which colony was fixed with French Guinea in 1895 as coinciding, south of the source of the Niger, with the thirteenth meridian west of Paris, an exchange of notes between the British and French Governments in July, 1911 (lately printed as Treaty Series, No. 9, 1912), adopted a natural line formed by the courses of rivers in place of the former conventional line, and this has lately been surveyed by a French party under Captain Schwarz, the representative of the Republic in the delimitation with Liberia, begun in 1911. From Tembikunda, near the

source of the Niger, the boundary is defined as follows: Starting from a boundary pillar set up in 1896 in 9° 5′ N., 13° 7′ 44·4″ W. of Paris, it runs slightly north of east through eleven pillars set up by the joint commission of 1903, the last of which is situated at the source of the small river Uldafu. This stream is followed to its junction with the Meli, and this in turn to its junction with the Moa or Makona. Ascending the Thalweg of the last-named to its intersection with 13° W. of Paris, it then passes to its southern bank, which it follows up to the meeting of the three frontiers of French Guinea, Sierra Leone, and Liberia. By the arrangement between Great Britain and Liberia in January, 1911, this point lies at the junction of the small river Dundogbia with the Makona. The Anglo-Liberian frontier follows this stream to its source and afterwards runs generally south to the headwaters of the Magoi (a secondary tributary of the Makona). The Magoi is then followed down to its confluence with the Mawa, and this to its intersection with the old frontier of 13° W. of Paris. This gives to Sierra Leone a belt of territory running east between Liberia and French Guinea, and containing the important centre of Kanre Lahun, to which the Sierra Leone railway will eventually be extended.* The other West African frontier above alluded to is that between Togo on the one side, and Dahome and the French Sudan on the other, which, after being surveyed by a joint commission, was the subject of an agreement between France and Germany on September 28, 1912. As is so often the case where conventional lines are adopted, many questions had arisen as to the ownership of villages or small areas lying close to the boundary, and these are finally settled by a series of compromises which cause the frontier to deviate at a number of points from the mathematical line (where such had been previously adopted), while maintaining its general direction. Thus, on the northern frontier, French territory oversteps the 11th parallel to include the village of Pugno and its appurtenances, while further west German territory goes north of the same parallel. Similar slight divergences from the meridian previously recognized as forming a large part of the eastern boundary are also now accepted. The text of the new agreement is printed in the *Deutsches Kolonialblatt* of October 15, 1912, and a sketch-map showing the course of the frontier is given in the *Kolonialzeitung* of October 26.

Survey of the new Kamerun Frontier.—Various points of detail connected with the delimitation of this frontier with French Equatorial Africa having been settled by a Franco-German Conference which met at Berne during the past summer, the commissioners for the survey and demarcation of the boundary-line on the spot have proceeded to the scene of action. The personnel is organized on an unusual scale, as necessitated by the extent of country to be dealt with. Thus each commission is divided into two sections, and each of these again into two expeditions, operating on different parts of the frontier. The French parties, charged with work on the east and south respectively, are headed by M. Périquet (formerly an army officer, now a civil administrator) and Captain Crépet; and those representing Germany by Captain Von Ramsay and Captain Zimmermann. To each of the subsections several Europeans will be attached, as surveyors, geographers, medical officers, etc. Valuable additions to geographical knowledge may be expected from so carefully organized an undertaking.

* The precise limits of the Kanre Lahun extension of Sierra Leone had not been defined when our map of the Liberian boundary was prepared early in 1911 (*Journal*, vol. 37, p. 449). This, therefore, now requires slight modification.

Captain Tilho's New Expedition.—Captain Tilho, the well-known explorer of the Lake Chad region, has returned to that part of Africa as French Administrator of Kanem. He left France in June last, and took the Congo-Shari route to his destination. It is understood that he hopes, apart from his political duties, to investigate the vexed question of a former connection between Lake Chad and the Nile, the possibility of which has been upheld, among others, by the French geologist Chudeau. This is one of the most interesting problems of African geography awaiting solution (see Mr. Cana's remarks on the subject in vol. **38**, p. 463).

AMERICA.

Mr. Tyrell's Expedition to Hudson Bay, to which reference was made in the July number (p. 88), has been brought to a successful conclusion. The traveller informs us that he went to the mouth of the Nelson river by the ordinary trade route, spending the rest of the summer on Hudson bay and returning up the Severn river and by a previously unexplored route across the new district of Patricia to the Grand Trunk Pacific railway. He was back in Toronto before the end of October.

Excavations at Tiahuanacu, Bolivia.—The attention directed of late years to the antiquarian remains at Tiahuanacu has led the Bolivian Minister of Public Instruction, at the instance of Señor Ballivián, to provide funds for the systematic excavation of the site of the ruins, with a view to saving them from further depredations of a kind to which they have been subject in the past. The work has been carried out under the supervision of the Director of the National Museum, Dr. Otto Buchtien, and a report on the results so far gained has been circulated by Señor Ballivián. At a depth of from 3 to 10 feet below the surface a large quantity of pottery was found, of pre-Inca Age, many of the objects being in a perfect state of preservation. They at once rivet the attention by the fineness of the material, and in the case of the cups, bowls, etc., by their artistic form as well as by the excellence and freshness of the colouring. The diversity of the ideographs and pictographs represented on them will demand special study by experts. Among the smaller objects, a human figure in silver is interesting as showing the nature of the garments worn in that ancient time. Worked stones have also been found, and skulls showing distinct traces of deformation. One of the latest discoveries had been a skull, belonging apparently to an ancient race, and showing the frontal suture and larger in all its dimensions than skulls of the present day. Further reports are promised as the work progresses.

AUSTRALASIA AND PACIFIC ISLANDS.

Recent Explorations in Dutch New Guinea.—Since our last summary of Dutch exploring work in western New Guinea (*Journal*, vol. **38**, p. 536) various accounts of explorations have appeared in the *Tijdschrift* of the Netherlands Geographical Society. A preliminary report, given in the last number of that *Journal* for 1911, on the survey of the great eastern branch of the Mamberamo (known at first as the East river, but since named the Idenburg) has been supplemented by a fuller report, printed in the May number of this year. The survey was carried out by Naval-Lieut. J. T. J. de Wal, who traced the river's winding course a long distance to the east-south-east, reaching, on one of its upper branches, a point near the foot of the Central range in 139° 43′ E. The length of its course is therefore little inferior to that of the main western

arm. Its basin seems very sparsely inhabited, only three permanent settlements being seen on the main stream. An interesting geological collection was brought back. The January number of the *Tijdschrift* contains a full account (with map) of the explorations of Captain Sachse near the north coast, referred to in our former note. The western peninsula, sometimes known as the Vogelkop (bird's bill), was traversed in various directions in 1911 by Captain Koch, Lieut. van der Ploeg and others, and short accounts of the journeys appear in the third and fourth numbers of the *Tijdschrift* for 1912. In the south of the island, the expedition under Captain le Cocq d'Armandville (*Journal*, *loc. cit.*) has done some good work, and various reports of progress have been printed. Its operations have been concerned with the district between the south coast and the snowy range, and between the North or Lorentz river and the Utakwa (*Tijdschrift*, September, 1912). Between February 23 and April 4, 1912, an examination was made of the North-west river beyond the turning point of Hellwig in 1908 (*Journal*, vol. 34, p. 683), though rapids at last compelled a return. Good view-points were found from which the whole mountain range between Carstensz and Wilhelmina peaks was clearly visible, and bearings were taken by which the positions of a number of prominent points were fixed. Subsequently the channel joining the North-west with the Hellwig river was examined, as well as the latter river itself, and a new stream to which the name Pater le Cocq d'Armandville was given in memory of a missionary drowned in 1896 while attempting to rescue a native child. On this river natives were met with, whose speech was quite different from that of the Merauke people. A detachment was sent back hence to the upper North-west river to cut a path to a hilltop 4300 feet high, from whence to gain a view of the mountains about the sources of that river. Lastly, in the May number of the *Tijdschrift* there is an account (with map) of an examination of the Wildeman river, an important southern branch of the Island river, in the more easterly part of the southern coastal plain.

POLAR REGIONS.

Russian Voyage by the North-East Passage.—The German plan for a scientific voyage round the Arctic coasts of Asia, to which reference was made in the *Journal* for August (p. 220),* has its counterpart in a Russian expedition which sailed from St. Petersburg in July under the leadership of Lieut. G. Brussilov. The vessel secured for the purpose is none other than Sir Allen Young's old ship the *Pandora*, which has been re-named the *Saint Anna*. It is proposed to winter at the mouth of a Siberian river, probably the Khatanga, and to complete the north-east passage, never yet achieved by a Russian, during 1913. Geographical and ethnological work will be done on the way.

Captain Sedov's Expedition, the organization of which was announced in the August number of the *Journal* (p. 220), only left Arkhangel at the end of August, in consequence of various difficulties. Reports have been current of the wreck of the vessel, as to whose seaworthiness some doubts had been expressed before the expedition started; but they do not appear to have been definitely confirmed.

* The leader of the proposed German expedition, Lieut. Schröder Stranz, undertook an expedition to Spitsbergen last summer for the sake of gaining experience in Arctic travel.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

Earth-movements round the Northern Atlantic.—Prof. Gerard de Geer contributes to the September number of *Petermanns Mitteilungen* a suggestive paper on changes of level of continental proportions which have taken place over the region between northern Europe and Greenland within recent geologic times. The subject has been frequently touched upon by geologists, including Suess, who, Prof. de Geer says, has expressed the opinion that no evidence exists of a continental elevation, but that even in the case of Scandinavia the observed shore-lines are to be explained as the result of a general change in the sea-level.* So far back as 1888 Prof. de Geer showed reason for holding the opposite view, pointing out that the change of level in the case of Scandinavia was a phenomenon affecting a closed area, from the centre of which the extent of movement diminished radially in all directions. It must therefore have been of the nature of an elevation of the land, not of a general fall of the sea-level. Further that movements affecting areas of continental proportions on both sides of the Atlantic, and bearing no resemblance to processes of mountain building, could only be due to general vertical movements of the crust caused by displacements of the mobile masses below it. In his recent paper, Prof. de Geer extends his conclusions further and ventures on a general account of the processes of which the region in question has been the theatre in late Tertiary and Quarternary times. He points out that the regions of recent continental uplift correspond in a striking way with the old denuded areas, and also with the centres of late Quarternary glaciation, a fact which affords support for the idea of Jamieson, that the uplift was due to their unloading by the removal of the ice. These lands all lie around the remarkable depressed area on the borders of the Atlantic and Arctic oceans, for which, in the absence of a special existing name, he suggests that of "Scandic." It is the subsidence of this basin which he assigns as the cause of the elevation of the surrounding lands, and he points to the gradual and regular character of the bounding slopes as bearing out this view. Although in parts coinciding with the outer margin of the continental shelf, their gradual nature even here indicates that they are the result of tectonic causes, and not, as some have supposed, of deposition round the continental margin. The actual land margin, on the other hand, is steep and broken on all sides of the Scandic depression by sharp indentations (fiords), the origin of which the writer attributes to fractures accompanying the uplifts of the several horsts. He endeavours to show that the fiord formation is the more pronounced the nearer the depressed basin approaches the existing land. Another accompaniment of the tectonic movement seems indicated by the extensive outpourings of basalt along a considerable portion of the margin of the Scandic depression, *e.g.* on the east coast of Greenland and the Færoe-Iceland bank. In the latter part of the paper the author deals particularly with the geological history of Fenno-Scandia, and in the accompanying map attempts to reconstruct (1) the original contours of the Tertiary raised area, showing the main centres of elevation to have lain in the west of the modern Scandinavia; (2) the lines of equal uplift in Quarternary times, the maximum having now shifted considerably east, towards the west coast of the Baltic trough. This somewhat unexpected position of the greatest

* Many of the terraces in the Norwegian fiords are, however, considered by Suess as "monuments of the retreating ice." (*See* 'The Face of the Earth,' Vol. 2, 1906, p. 361.)

uplift may be accounted for by the fact that the ice-parting, and therefore the greatest eventual relief of weight, lay considerably east of the mountain chain. Prof. de Geer's views will no doubt be contested by some, but his prolonged study of the question both on the spot and in existing literature entitles them to careful consideration.

The Earthquakes of 1907.—The central office of the International Seismological Association has recently issued the catalogue of the earthquakes of the year 1907 in three parts. Messrs. E. Scheu and R. Lais have compiled the great catalogue of sensible shocks. In former years this catalogue was a simple chronological list for the whole Earth. For 1907, however, the earthquakes are classified in regions, twenty-three in number, and this has added greatly to the value of the work. The same part also contains monographs of the more important earthquakes, and a discussion of the distribution of all the shocks in time and space. The two other parts, prepared by Mr. S. Szirtes, consist of the seismographic records of earthquakes in all parts of the world. In each are given the initial epochs of the two series of preliminary tremors and of the principal movement. The third part is a valuable list of the seismographic records of all the great earthquakes (ninety-six in number) of the year 1907, the position of the epicentre, and the distance from it of each observatory.

HISTORICAL GEOGRAPHY.

The Legendary Islands of the North Atlantic.—Yet another study of the phantom islands thought to exist in the ocean west of Europe before the discovery of America has lately appeared, being contributed to the *Proceedings of the Royal Irish Academy* (vol. **30**, sect. C, No. 8, August, 1912), by Mr. T. J. Westropp. The author, who makes no claim to completeness for the study, has evidently devoted much time and research to the question, and has brought together a large body of references which will be useful to other students. He has hardly, perhaps, added anything new to the knowledge of these legendary islands, and does not appear to be quite aware how much has already been written on the subject. At all events, he does not refer to the earlier contributions of writers like Buache, Humboldt, D'Avezac, Gosselin, Gaffarel, and others.* He approaches the question mainly from the point of view of a student of early Irish literature and legend, the voyages of St. Brandan occupying a central position in the discussion. These he considers, no doubt rightly, to have had a substratum of fact, though the accounts have been embellished by the accretion of legendary matter round the original core of truth. He has made a careful study of many of the old portolan and other maps, as reproduced in Nordenskiöld's Atlases and other easily accessible sources. Some, however, seem to have escaped him, *e.g.* the chart of Beccario, of 1435, reproduced in the *Studi Biografici e Bibliografici*, first issued at Rome in 1875. In accordance with the specially Irish standpoint adopted, the chief attention is focussed on the supposed island of Brazil, though curiously enough nothing is said as to the origin or meaning of the name, nor is the relation between it and the St. Brandan legends made as clear as could be wished. In order to cover the whole subject, the study needs extending so as to touch upon other rumoured islands, such as that which appears in some early charts, as "La Man

* A useful list of references to these early writings appears in Mr. Miller Christy's note on Busse island, in vol. 1 of the Hakluyt Society's 'Danish Arctic Expeditions' (1897).

Satanaxio" (if, indeed, this does not really represent two distinct names), formerly interpreted as signifying the "Hand of Satan," but more probably a corruption of "Saint Athanasius." On the chart of Beccario, above cited, it appears simply as Satanagio, being here a large square island forming a northern counterpart of "Antillia." As above remarked, Mr. Westropp's memoir may serve a useful purpose in summarizing a good deal of the material for the benefit of those unable to refer to all the scattered literature of the subject.

The Manuscript Succession of Ptolemy's Maps.—Prof. J. Fischer, the fortunate finder of the two great maps of the Alsatian geographer Waldseemüller, has been known for some time as the most persevering student at present living of all that can throw light on the history of Ptolemy's maps, as reproduced, in MS. or in print, at the time of the great revival of learning. Some hint of the results of his researches has been given from time to time, *e.g.* in his well-known work on the early northern voyages as elucidated from the cartographical side. He has now put students under an obligation by sketching the general results of his labours in the August number of *Petermanns Mitteilungen*. Those results have only been gained by the most persevering and continued investigations in the great European libraries, the treasures of which, in the matter of Ptolemy MSS., have for the first time been fully disclosed by him. He describes in graphic style the way in which the first clues were gradually followed up until at last the whole pedigree of the MS. reproductions of the maps was clearly set forth. The first important find was the fine Ptolemy MS. by Nikolaus Germanus at Castle Wolfegg, which proved to be the groundwork of the Ulm editions of 1482 and 1486. Further search brought to light a dozen other fine MSS. by Donnus Nikolaus, and showed the influence which these must have exercised on the famous Rome editions of 1478, 1490, etc. But only after protracted inquiries was the actual groundwork of these brought to light in the splendid Codex Ebnerianus, formerly at Nuremberg, but which, after various vicissitudes, had, like so many similar treasures, finally found its way into an American library. Eventually it was proved that, directly or indirectly, all the printed Ptolemy maps down to 1513 could be traced back to Donnus Nikolaus. To follow back the succession still further, a large number of Latin MSS. were examined, including a remarkable one at the Vatican which, while agreeing with most of the others in the outlines of the maps, showed great divergencies in the matter of nomenclature. This indicated the probability that a Greek MS. was the basis of the whole, but though one was found which appeared to be the common source of all the Greek versions, a different, or at least an additional collateral source, seemed needed in the case of the Latin ones. This too was at last discovered in the form of a Greek MS. which differed from all the rest in that the traditional twenty-seven maps were here replaced by sixty-eight, including general maps of Europe, Africa, Northern and Southern Asia. That this type really represented a Ptolemy recension was proved by the discovery of similar examples in Florence and London. We therefore find that the oldest MSS. fall under two distinct types, and though the second, that with sixty-eight maps, is not represented by any of the known Latin MSS., its influence on these is clearly traceable in certain details. An interesting incidental result of the professor's studies may be here mentioned, though not alluded to in the article under notice. This is the discovery at the British Museum of the missing leaves (including a portion of the first map) of the well-known Mount Athos Ptolemy—the earliest so far known—reproduced in facsimile in 1867, under the editorship of Messrs. Sevastianoff and Langlois.

GENERAL.

The Livingstone Centenary, 1913.—As already announced in the Provisional Programme for the session, the Society will hold a meeting in commemoration of the birth of David Livingstone on March 17, 1913, when Sir Harry Johnston will give an address, and an exhibition of relics associated with Livingstone's work will be arranged. It is hoped that Sir John Kirk, the only survivor of the expedition of 1858–64, will be present. The celebrations of a more general character throughout the country will include a national memorial service in St. Paul's Cathedral on March 19, the anniversary of the explorer's birth, and in the evening of the same day a national demonstration at the Albert Hall. The speakers at this will include Lord Balfour of Burleigh, Sir Harry Johnston, Dr. Wardlaw Thompson (senior Foreign Secretary of the London Missionary Society, under whose auspices Livingstone first went to South Africa), and Bishop Tucker of Uganda. Special celebrations will be held at Glasgow, both by the University, which claims the explorer as a former student and graduate; by the Elgin Place Congregational Church, of which he was a member; and by the municipality. Demonstrations are also being organized in Missionary and other circles, in various parts of the British Isles, as well as in the British Colonies (particularly South Africa) and the United States.

Tropical Sunlight.—A systematic study of the effects of Tropical sunlight on mankind has been taken up in the Bureau of Science at Manila, and the results obtained from the first two years' work were outlined by Dr. Paul Freer in the *Philippine Journal of Science* (Part B, Tropical Medicine) for February, 1912. They have led to some interesting and not altogether expected conclusions. It is usually supposed that the greatest effect of tropical sunlight on man is due to the rays of greater refrangibility in the violet and ultra-violet portion of the spectrum. The first investigation was therefore concerned with the varying effect of these rays in different latitudes in causing decomposition of oxalic acid in the presence of uranyl salts. Dr. Freer obtained the co-operation of colleagues in various parts of the world for the required measurements, and at the time of writing, in addition to those obtained at Manila, returns had been received from Kuala Lumpur, Honolulu, Washington, Tucson (Arizona), and Khartum. In regard to the first three places the measurements showed such slight difference in the effects that the photocatalytic action may be said to be the same in each. The data from Tucson were but few, but those from Washington, in spite of a lower average (which is still astonishingly high), showed at times as much effect as the places first mentioned. At Khartum the average was higher, but this was due to the remarkably uniform character of the insolation, the days of maximum illumination not differing materially from those in the other localities. These results showed the importance of a study of the rays from the much larger remainder of the spectrum, including the heat rays, though means for a study of their relative effects are not so easily found. Pyrheliometer readings are not yet at hand from tropical latitudes, but while the data for temperate zones show that meteorological phenomena, percentage of possible sunshine, and varying atmospheric transmissibility have more influence than variation in the actual insolation, such factors can clearly have as full play in the tropics as in other regions. In the absence of other means of solving the problem, direct observations of the effects of insolation on animals and man were made by Dr. Hans Aron. Monkeys, with their small development of sweat-glands, though naturally at home in the tropics, were found to be unable to survive direct exposure to sunshine so long as two hours,

whereas, when shaded from the direct rays, or when the heat increment was carried away by an artificial air current, they suffered in no way. The fatal effect otherwise produced is thus clearly one of heat. In man, with his highly developed sweat-glands, the means of heat-regulation by evaporation are much more complete, and experiments showed conclusively how this mechanism protects human beings. Comparative experiments with individuals of white and dark skin, *e.g.* a Canadian, a Filipino and a Negro, showed a slightly greater rise in body temperature in the case of the brown skin, and a decidedly greater one in the case of the Negro. Similar experiments with light and dark coloured animals likewise showed that the darker the colour the more apparent do the effects of insolation become, pigmentation giving protection against the ultra-violet, but not against the heat rays. Protection against the former being so easily gained by the wearing of clothes, skin colour cannot, Dr. Freer holds, be an important factor in determining adaptability to climate. He considers that in an insular climate like that of the Philippines insolation need not be dangerous, though elsewhere he allows that relative humidity, from its effect on perspiration, is of importance. It may perhaps be questioned whether the experiments have yet been numerous enough to be conclusive, and whether all sides of the question have been quite sufficiently considered; but the investigation is of great interest and should in time lead to more definite knowledge of an important matter.

OBITUARY.

Professor F. A. Forel.

The death of Professor François Alphonse Forel, which took place on August 7, 1912, has removed the leading limnologist in the world; indeed, it may be said with more accuracy than can usually be claimed for such a title, that M. Forel was the founder of the modern science of limnology. His work on the Lake of Geneva has been the pattern for all the investigators who have followed him. Born at Morges on the margin of the lake in 1841, he was brought up in view of the great sheet of water to which he devoted the enthusiastic researches of a lifetime. The great lake has been a subject of study for many investigators during two centuries, and much has been written since 1730 on the peculiar movements of the water known as seiches; but it was not until M. Forel instituted his tireless series of observations that the mystery of these movements became plain. The work was no drudgery to him, but a veritable passion. His love for the lake drew him on from one series of researches to another. Though a medical man by profession, he became a geologist because he must know all about the bed of Le Leman; he became a physicist because he must know all about its water, the progress of heat in its depth, the multitudinous response to wind and pressure changes, the propagation of waves of every origin and of all amplitudes and periods; he became a biologist because he must know all about the life of aquatic plant and animal; he became an anthropologist and a historian, for he must know all about the prehistoric lake-dwellers and the surge of nations which splashed over the mountains from Rome or Germany or France. In the volumes of 'Le Leman' Forel reared his own monument, and it is characteristic of the man that he felt that his relation with his native lake was too intimate and personal to allow him to write a fair and impartial treatise on his own science of limnology. Nevertheless his 'Handbuch der Seenkunde' shows that

his enthusiasm for the lake did not detract from his power of generalizing the facts common to all lakes. Professor Forel's literary style was full of charm, his descriptive passages flow like a swift and sparkling stream, his exposition of observed facts is clear and transparent as the lower reaches of Le Leman itself. His personal presence was no less attractive, and many must still remember the pleasure he gave to all the colleagues whom he met for the first time at the London meeting of the Geographical Congress in 1895. He visited this country again last year for the International Seismological Congress, and on that occasion he went to Scotland and gave an address on 'Mirages over Lake Surfaces' at the Royal Society of Edinburgh, of which he was an Honorary Fellow. He followed with the keenest interest and the most generous appreciation the great extension of our knowledge of seiches, his own subject in a peculiar degree, which resulted from the elaborate study of the late Professor Chrystal and the other members of Sir John Murray's Survey of the Scottish Lochs. He was so closely associated with his researches on the Lake of Geneva that there is some danger of forgetting the excellent work he did in the study of Swiss glaciers, and in seismology, which would have sufficed to win him a respected place amongst men of science even if he had never seen a lake save as a tourist.

H. R. M.

E. L. Osbaldeston Mitford.

The death, in May of this year, of a centenarian traveller who achieved a somewhat notable journey no less than seventy years ago, merits more notice than it has yet received. The late Mr. Osbaldeston Mitford, of Mitford, Northumberland, was born on October 31, 1811, and was thus in his 101st year at the time of his death. His ancestors had been men of note in the north from early times, having been in possession of Mitford Castle in the days of Edward the Confessor. He himself was the third son of Mr. Robert Mitford, of the Government Audit Office, and was early attracted to a life of adventure, finding his way to Morocco when only eighteen, and becoming British Consular Agent at Mazagan four years later. This post he held for two years, during which his efforts to secure the opening of the port to foreign commerce involved him in some amount of friction with the Moorish Government. Having paid a visit to the Holy Land with a companion afterwards famous as Sir Henry Austin Layard, and being on the look-out for further employment, his attention was attracted to Ceylon as affording a possible opening. He resolved to proceed thither, and arrived at the somewhat romantic decision to gratify his love of travel by making the journey by land, with the slight exceptions of the short sea-passages across the Straits of Dover, the Bosphorus, and Palk strait.

The route chosen led through the Balkan peninsula, Asiatic Turkey, Persia, Afghanistan, and India, involving a total distance of some 10,000 miles, more than half of which were done on horseback. As far as Persia, he had the company of a fellow-countryman some years his junior. Many of the countries traversed were then but little known, and many difficulties and dangers had to be surmounted. In the first part of the Asiatic journey the knowledge of Arabic he had acquired in Morocco stood him in good stead, while his remarkable gift for languages enabled him, during a stay of a few weeks at Bagdad, to acquire sufficient Persian to carry him through that country. The hardships and exposures of the journey somewhat affected his health, and on reaching the shores of the Indian ocean he accepted an invitation to go by boat to Bombay, thus missing one stage of the land journey as originally planned. Arrived at Colombo two years and ten months after leaving England, he entered the Civil Service of the colony and gained rapid promotion,

He resided twenty-five years in the island, marrying the daughter of Archdeacon Bailey in 1844, and retiring from the position of Government Agent in 1866. The narrative of his remarkable overland journey did not appear till over forty years after it took place, being brought out by him in 1884 under the title 'A land march from England to Ceylon forty years ago' (see review in *R.G.S. Proceedings* for that year, p. 684).

On the death of his eldest brother, Colonel J. P. Osbaldeston Mitford, in 1895 (the second brother having also died before him), he succeeded to the family estates, which, besides Mitford Castle, included Hunmanby Hall near Bridlington, Yorks.

Lieut. H. G. Bell, R.E.

Lieut. H. G. Bell, of the Survey of India, who died in the Pamirs on July 25 last, passed through Hunza in May, according to the *Pioneer*, on his way to undertake the necessary operations for joining up the Indian and Russian triangulation systems. Colonel Tcheikine had brought the Russian triangulation from Turkestan southwards over the Pamirs, and Lieut. Bell was to have met him in that region. The English surveyor had tried to carry the triangulation across the Hindu Kush through Gilgit in the summer of 1911, but the lofty and difficult mountains proved insuperable, so in 1912 he set out to effect his purpose by way of Hunza. It appears that he died from colic north of the Mintaka or Mintiker pass. The deceased officer was twenty-seven years of age, and of very robust physique. He was an excellent surveyor, and personally much regretted.

CORRESPONDENCE.

The International Map of the World.

Ordnance Survey Office, Southampton, October 20, 1912.

Sir Charles Watson, in his presidential address to Section E of the British Association at Dundee, last September, criticized the resolutions of the International Map Committee as regards two particulars, first, with reference to the adoption of a system of altitude tints, and secondly, with regard to the necessity of distinguishing between regions which have been adequately surveyed and those which have not.

As regards the first matter, may I point out that the International Committee has met the objection beforehand? Resolution 6 (*a*) lays down that "there may, however, be published other editions without altitude tints, and these may be completed by tints, or by additions required for other purposes." The other editions will be uniform with the principal edition as regards the sheet lines, the projection, conventional signs, the use of the Greenwich meridian and of the metre, the lettering and system of spelling and transliteration. As an instance, I may say that an outline edition of the sheets of the United Kingdom will be published as well as the "layer" edition.

As regards the second point, Sir Charles states that "the resolutions of the Committee appear to have been drawn up on the supposition that the whole world has been accurately surveyed." As a member of the Committee let me hasten to assure him that this was not the case. Moreover, the resolutions show clearly that the Committee, as might have been expected of such a representative body, were fully aware of the necessity of taking account of the fact that large portions of the earth's surface are, as yet, imperfectly surveyed. Resolution 6 (*d*) reads, "In parts where

the country is not sufficiently surveyed to enable the contours to be drawn, the terrain shall be shown by broken contours or form lines." And again, in order that the public may know the general reliability, or the reverse, of the information depicted on the sheets of the International Map, Resolution 12 (*f*) lays down that "each sheet shall bear a list of the principle sources of information from which it is constructed."

C. F. Close.

"Mountain Sickness."

On page 258 of the September *Journal*, Dr. Kellas speaks of "that debatable subject, the so-called mountain sickness." His expression "so-called" seems to indicate that he has grave doubts about there being such a disease.

If there is a doubt as to the presence of this malady in other parts of the world, there seems to be no possible question as to its virulent activity in South America, At any rate, when I was in Peru I heard much of "soroche," as it is there called, and my own painful experiences have fully convinced me that it is a disagreeable reality.

My first meeting with "soroche" was in May, 1903, when I went by railway from Lima to Yanamina, a mining hamlet not far from Oroya. Acting on the advice of persons familiar with the journey, I went on the first day to Matucani, a railway station at about 8000 (?) feet altitude, and passed the night there in order to make the change in altitude, from nearly sea-level to about 15,000 feet, less abrupt.

At 11.30 the next morning I boarded a train that had left Lima early in the day, and was *en route* for Oroya. The sun shone brightly and the Peruvian passengers were laughing and joking. After reaching an altitude of about 12,000 feet, laughter ceased and with increasing altitude faces grew paler, and by the time we had reached 14,000 feet several passengers, fully overcome by "soroche," were vomiting.

Near the summit I left the main line and went off on a branch, whose highest point is practically the same height as Mont Blanc (15,782 feet), to Yanamina. I had not been ill on the train, but felt depressed when I went to bed and my night was troubled by confused dreams and nausea, finally relieved by vomiting. On the whole, I felt almost as if I had been seasick.

Dr. Kellas mentions inadequate training, indigestion due to unsuitable food, overstrain, exhaustion, psychic effects, high temperature, chill, and snow glare as "other more active factors" causing sickness, but I do not see how any of these factors can account for the sharp attacks of "soroche" that overcame the passengers on the Lima-Oroya train after reaching an altitude of 12,000 feet; and apparently the change in altitude is the principal cause. It is perfectly possible that there may be some other unknown factor, for experience in other parts of Peru indicates that "soroche" does not depend entirely on change in altitude. In this connection accounts of aviators who are now ascending to altitudes of over 18,000 feet would be most interesting.

W. H. Shockley.

I quite understand Mr. Shockley's position, but he has hardly understood mine, which could be only imperfectly indicated in such a condensed summary. I do not state that mountain sickness does not exist, but I intended to point out that it need not affect climbers until at least over 23,000 feet has been ascended, provided certain precautions are taken. Climbers cannot however escape

"*mountain lassitude*" at elevations over 20,000 feet, so that lassitude is normal, but sickness quite abnormal and unnecessary given proper conditions. Perhaps I might mention that the conclusions stated in the paper were confirmed in August of this year when with two Sherpa Nepalese an ascent of the Kangchenjhau (22,700 feet) was effected, without any tendency towards mountain sickness becoming evident.

It is curious that Mr. Shockley omits "*want of acclimatization to high altitudes*," from the causes of mountain sickness stated in my paper, because this cause meets the case he mentions. In ascending from sea-level to 15,000 feet, the pressure of the atmosphere diminishes from 30 inches (or 760 mm.) to 17 inches (or 430 mm.), while a further ascent from 15,000 feet to 20,000 feet, only means a change from 17 inches to 14 inches pressure. It is obvious therefore that 15,000 feet may be considered a high level relative to Lima (500 feet), and it is not to be wondered at that the average man should suffer in making the ascent by train as described, because he is very rarely in that thorough state of training necessary for mountain work. He is handicapped too by the fact that his tissues have to rapidly adjust themselves to changes of altitude, while he remains comparatively quiescent. In climbing the exercise will help this adjustment. I am therefore not at all surprised at Mr. Shockley's statement regarding the prevalence of "soroche" under the given conditions. I am inclined to think, however, that a climber in first-rate training, who had not long before been up at about 15,000 feet for some time, so as to acclimatize himself to high levels, could make the ascent from Lima to Yanamina with impunity, provided he was careful regarding diet. Heavy meals must be avoided under such conditions.

Perhaps Mr. Shockley might be able to state whether engine-drivers and guards of trains making the ascent he mentions are ever troubled with "soroche." I am glad that he has written about his experiences, because it may induce others, *e.g.* aviators, to state any interesting facts known to them in connection with disturbances of health caused by alterations of altitude.

A. M. Kellas.

Orthography for Unwritten Languages.

Mcngu, Barotzeland,* N. Rhodesia, September 25, 1912.

I see in your July number a paragraph on "Orthography for unwritten languages." The writer says "The system of this Society (*i.e.* R.G.S.), though useful for proper names, is unsuitable for this purpose." By which the writer means, I suppose, that proper names, though the names invented by the natives of the country, are of interest only to "geographers" in Europe, while the *language* of the people is of more vital interest to those who have to live amongst them and to have intercourse with them, and, therefore, more care has to be taken in describing accurately the various sounds of their language apart from the names of mountains, rivers, etc.

I quite see the writer's point, and agree with him, that a proper appreciation of the use of phonetics in learning a native language thoroughly is necessary. At the same time (after sixteen years in Africa), I have come to the conclusion that the system of the R.G.S. in respect to "orthography for geographical names" (in 'Hints to Travellers') cannot be improved upon as regards the *languages* of Central Africa.

No doubt there are shades of sound for which a more elaborate system than that

* The Country of the Barozi, not Barotse.

provided for by the R.G.S. is required for the advanced student, but it must be remembered that these native languages have to be learnt by Englishmen and others (Government officials, traders, missionaries, farmers, etc.) in as short a time as possible. Grammars and dictionaries are written. It is best that they should be as simple and concise as possible. Why endeavour to show that *A*wemba is not really Awemba nor Abemba, but that the *w* is a mixture of *w* and *b*? It is better, for the student at any rate, to pronounce it *w* or *b* as he reads it in the book and find out for himself the shade of sound later.

The Rev. Dr. Heatherwick, of the Blantyre Mission, has written an excellent grammar and vocabulary of "Chinyanja." In it, however, one is constantly coming across words with *ph* and *th*. These consonants do not represent the *f* and the *th* (as in our "the") but are intended to represent an aspirated *p* and *t* which we do not possess in the English language. This aspirated consonant undoubtedly exists in Chinyanja as in other Bantu languages, but to see it in print is confusing to a man trying to learn a native language from a book.* (If it was written *p'* or *t'* it would be better.) What I am driving at is that the R.G.S.'s system is sufficient for ordinary purposes, *i.e.* for compiling the usual grammars and dictionaries that are generally to be found in "new countries" (nearly always written by missionaries).

The main thing is to make orthography as easy as possible. If a white man says "pewa" instead of "p'ewa" (or "phewa," as written by Dr. Heatherwick) he will probably be understood by the native (as long as the rest of his sentence is not entirely ridiculous).

Most of the English Missionary Societies have adopted the R.G.S.'s spelling. The Foreign Missions have peculiar ways of spelling. The *ts* instead of the *z* (used all through by the French Mission here); the *tsh* instead of *ch*; *oa* instead of *wa*; yet Le*w*anika instead of Lu*a*nika.

J. C. C. Coxhead,
Acting Resident Magistrate, Barotse District.

P.S.—The French Mission are accused of having spelt Lewanika's name with a *w*, yet the French have no *w* apparently (except in wagon).

Ascent of Mount McKinley.

101, Mount Street, W.

Referring to your announcement in the November number of the *Geographical Journal* of Prof. Parker's attempt on Mount McKinley, it may interest you to know that a local earthquake took place on Mount McKinley at the same time as the eruption on Ketmai last summer. Prof. Parker and Mr. Belmore Brown (with whom I happened to return through U.S.A.) had descended the mountain only two days before, but for which they would infallibly have been killed by the enormous masses of ice which were displaced and kept rolling down the mountain. As it was, they themselves and their tents were knocked down, besides a herd of caribou half a mile away which they happened to be watching at the time. Warburton Pike and I, who were near Dease lake, Cassiar, British Columbia, noticed a thick haze for four days—which we thought at the time was smoke from a bush fire—and ⅛ inch of ash was subsequently found on the trail near to Dease lake, some 800 miles from Ketmai, while quantities of fine ash came as far south as Victoria, British Columbia, 1200 miles distant. It would be interesting to know how far

* The R.G.S. system allows *ph* for *p* followed by an aspirate.—[Ed.]

south the ash from the eruption was carried. Mr. Belmore Brown is about to publish his account of the Mount McKinley expedition in the *American Geographical Magazine* and the *World's Work*.

OSBORNE BEAUCLERK.

Captain Bailey's paper on "South-Eastern Tibet and the Mishmi Hills."

Calcutta, October 29, 1912.

May I call your attention to a mistake in the note which was added to the map published with my paper in April last? The note says "Except where his route is crossed by that of the Pundit A.K., between Yenching, Shiuden Gompa and Krang, Captain Bailey passed through previously unexplored country." This is not quite accurate. In 1907 M. Bacot travelled along the route subsequently followed by me, from Petu to Menkong, and again in 1909 he travelled from Menkong to some point east of the Tsong La. Again, as I pointed out in my paper, the whole of the road from Michi to Rima had been traversed by A.K. in 1882, while in the Mishmi hills both Mr. Needham and Mr. Williamson had almost reached Rima. Unfortunately, during my journey I had neither M. Bacot's map of his 1909 journey nor Mr. Williamson's map with me, nor was M. Bacot's map accessible to me when I wrote the paper. I had hoped to correct the position of Menkong by an observation for latitude, but was prevented from doing so by the weather; but I have now seen M. Bacot's paper, and find that he took the latitude of that place, and had I known this my map could have been made more accurate by adjusting the position to his valuation.

F. M. BAILEY, Captain.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1912–1913.

First Meeting, November 4, 1912.—The Right Hon. EARL CURZON OF KEDLESTON, G.C.S.I., G.C.I.E., etc., President, in the Chair.

ELECTIONS.—*J. Proby Armstrong; George Edgar Joyce, B.A.; Cuthbert Henry McDowell; Stewart Edward White.*

The paper read was:—

"Influence of Geographical Conditions on Japanese Agriculture." By Miss Ellen Churchill Semple.

Second Meeting, November 15, 1912.—The Right Hon. EARL CURZON OF KEDLESTON, G.C.S.I., G.C.I.E., etc., President, in the Chair.

ELECTIONS.—*Henry C. Abraham; James C. Agnew; Ernest Frederick Allum; Wilfrid Batley; Edward Kenneth Biggs; Chas. Wm. Blacker; Lieut. Henry Le Marchant Brock (Royal Warwickshire Regt.); Fred. Bullock; Arthur Richard Canning; Sidney James Chesterton; Alfred Philip Cork; Lieut. Gordon Philip Cosens (Royal Dragoons); Lieut.-Colonel Arthur Bowdich Cottell, A.M.D.; Stenton T. Covington; Frederick Nutter Cox; George Churchill Crawford; John William Darwood; Edwin Gladstone Davies; George Reynolds Davies; Lieut. O. C. Downes (4th Batt. Rifle Brigade); Rev. T. Oliver Edwards; Claude William Erskine-Humphrys; Lancelot Douglas Fawcett; James F. Ford; Hollis Godfrey; Lieut.-Colonel Stuart Hill Godfrey (Indian Staff Corps); Herbert Harry*

Goodacre; Philip Grimley; Chas. Gottlob Grunhold; Lord Claud N. Hamilton (Grenadier Guards); Frank Edward Hardcastle; Frank Harker; Walter Kilroy Harris; Chas. A. John Hendry; Ellice Michael Hicks-Beach; Campbell M. Hunter; James Henry Hislop; W. J. Hodder; Denzil Hollis; Henry Chas. Hony; Theodore J. Hoover; Edward Hopkins; G. E. Howse; R. B. Huffman; Sir Henry Evan M. James, K.C.I.E.; William Jeffrey; Lieut. N. Morris Jenkins, R.A.; Lieut. M. G. Johnson (R. Warwickshire Regt.); Walter Judd; A. Mitchell Kellas; G. Kennett-Barrington, B.A.; Wm. Henry Kœbel; Kenneth Ledward; Lieut. Ralph Henry Leeke (Rifle Brigade); Captain Charles Edward Lembcke (Royal Fusiliers); Guy Liddell; William N. McClean, M.A.; Campbell D. Mackellar; Louis Meinertzhagen; George Merzbach; John Coney Moulton; Ernest William Munton; James Ernest Needham; Charles James O'Donnell; Alan Grant Ogilvie, B.A.; Lieut. G. St. John Orde-Browne, R.A.; Harry Parker; Rev. C. H. Parrish, M.A., D.D.; Rev. John Pitkin; Count George Noble Plunkett; Colonel Chas. Edw. Radclyffe, D.S.O. (Commander, 4th Batt. Rifle Brigade); Captain R. Ramsay; Rev. W. Hopkyn Rees; Thomas Conyers Robson; Major Hans Schomburgh; Lieut. J. W. Seigne (Royal Marine Light Infantry); Joseph Sheen; Major P. A. Silburn, D.S.O.; Thomas Freebairn Smith; V. G. Smith; The Earl Stanhope; William Henry Sykes; Henry Edw. Irving Taylor; Major Frederick Wm. Thomas; J. G. O. Thomson; Christopher Tower; Henry Cavendish Venables; Rev. Alfred Waller; Douglas Thurburn Wells; Thomas C. Wetton; Austin Travers Young; Gerard Mackworth Young.

The paper read was:—

"The Norwegian South Polar Expedition." By Captain Roald Amundsen.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C.R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
Jber. = Jahresbericht.
k.k. = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (Mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Adriatic. *M. k.k. G. Ges. Wien* **55** (1912): 5-39. **Brückner.**

Die dritte Terminfahrt S.M.S. *Najade* " in der Hochsee der Adria vom 16. August bis 5. September 1911. Vorläufiger Bericht, im Auftrage des Vereines zur Förderung der naturwissenschaftlichen Erforschung der Adria . . . erstattet von Prof. Dr. Ed. Brückner. *Sketch-maps, Illustrations, and Diagrams.*

See note in vol. **39**, p. 497. The fourth cruise is referred to in vol. **40**, p. 439.

Alps. **Coolidge.**

Alpine studies. By W. A. B. Coolidge. London: Longmans, Green & Co., 1912. Size 9 × 6, pp. xiv. and 308. *Illustrations. Price 7s. 6d. net. Presented by the Publishers.*

A collection of papers of very varied interest contributed in past years to Alpine periodicals. Some of them deal with the author's travels in more or less out-of-the-way Alpine districts, such as the Maritime Alps and the Swiss Dolomites. In others he throws the light of his wide studies on obscure points in Alpine topography and nomenclature.

Alps—Historical. **Coolidge.**

Dans les Alpes Pennines. Histoire topographique de la Haute Valpelline entre 1820 et 1862 et le Lyskamm dans l'histoire. Par W. A. B. Coolidge. (Extrait du Bulletin No. 8 de la Société de la Flore Valdôtaine.) Aosta, 1912. Size 9½ × 6½, pp. 16.

Alps—Hydrology. *Deutsche Rundschau G.* **34** (1912): 376-378. **Dittenberger.**

Der Lac Lioson. Eine geographische Kuriosität. Von Dr. Heinrich Dittenbergen.

The lake in question is drained to both the Rhine and Rhone systems.

Alps—Lake of Constance. *M. k.k. G. Ges. Wien* **54** (1912): 612-627. **Fuchs.**

Die österreichische Bodensee-Dampfschiffahrt. Von Prof. Dr. Karl Fuchs.

Alps—Lake Lugano. **Fehlmann.**

Internat. Rev. Hydrobiologie, etc., Biol. Suppl. **4** (1912): No. 1, pp. 52.

Die Tiefenfauna des Luganer Sees. Von J. W. Fehlmann. *Map.*

Alps, Eastern—Climate. **Mikula.**

G. Jb. aus Österreich (*Götzinger u. Krebs*) **9** (1911): 122-192.

Die Hebung der atmosphärischen Isothermen in den Ostalpen und ihre Beziehungen zu den Höhengrenzen. Von D. Hermann Mikula. *Maps.*

Alps—Western passes. **Coolidge.**

Entre Isère et Doire. Par W. A. B. Coolidge. (Extrait de la *Revue Alpine* de Juin, Juillet et Août 1912.) Lyon, 1912. Size 9½ × 6, pp. 42.

Austria—Bohemia. **Meissner.**

G. Jb. aus Österreich (*Götzinger u. Krebs*) **9** (1911): 193-229.

Die Talgeschichte der Stillen Adler in Ostböhmen. Von Dr. Alfred Meissner. *Sketch-map and Sections.*

Austria—Bohemia—Landslip. **Häberle.**

Ueber einen durch Blitzschlag verursachten Felsabsturz im Mittelgebirge. Von D. Häberle. (Sonderabdruck aus den Jahresberichten und Mitteilungen des Oberrheinischen Geologischen Vereines, N. F. Bd. II., Heft. 3.) Karlsruhe, 1912. Size 9 × 6, pp. 26-29. *Illustrations.*

Austria—Coast. *Abrégé B.S. Serbe G.* **1** (1912): 8 **Gavazzi.**

Die Verschiebung der Meeresgrenze in Kroatien und Dalmatien in historischer Zeit. Von A. Gavazzi. [*Glasnik Srvian G.S.* **1** (1912): 55-72.]

In the publication of the newly formed Servian Geographical Society the *Abrégé* (paged separately) gives brief analyses of the papers.

Austria—Elbe basin. **Engelmann.**

G. Jb. aus Österreich (*Götzinger u. Krebs*) **9** (1911): 38-94.

Die Terrassen der Moldau-Elbe zwischen Prag und dem Böhmischen Mittelgebirge. Von Richard Engelmann. *Sketch-map, Illustrations, and Profiles.*

Austria—Geology. **Schaffer.**

Geologischer Führer für Exkursionen im inneralpinen Becken der nächsten

Umgebung von Wien [. . . im Inneralpinen Wienerbecken]. Von Dr. Franz X. Schaffer. 2 vols. (Sammlung geologischer Führer, xii.–xiii.) Berlin: Gebr. Borntraeger, 1907–1908. Size 6½ × 4, pp. (vol. 1) viii. and 128; (vol. 2) viii. and 158. *Illustrations and Sections. Price M.7.90.*

Europe—Anthropology. **Munro.**

Palæolithic man and Terramara settlements in Europe. By Dr. Robert Munro. Edinburgh: Oliver & Boyd, 1912. Size 10 × 6½, pp. xxii. and 508. *Sketch-maps, Plans, and Illustrations. Price 16s. net. Presented by the Publishers.*

France—South-East. **Headlam.**

Provence and Languedoc. By Cecil Headlam. London: Methuen & Co., 1212. Size 9 × 5½, pp. xii. and 314. *Sketch-map and Illustrations. Price 10s. 6d. net. Presented by the Publishers.*

Holland—Trade. **Ministry of Agriculture, etc.**

A general view of trade and industry in the Netherlands. Composed by the Commercial Department of the Netherlands Ministry of Agriculture, Industry, and Commerce. The Hague, [1912]. Size 9½ × 6, pp. [468]. *Sketch-maps, Plans, and Illustrations. Presented by the Ministry of Agriculture, Industry, and Commerce.*

A series of twenty well-produced descriptive booklets, containing much extremely useful information on Holland in summarized form.

Italy—Florence. **Lucas.**

A wanderer in Florence. By E. V. Lucas. London: Methuen & Co., [1912]. Size 8 × 5, pp. xii. and 392. *Plan and Illustrations. Price 6s. Presented by the Publishers.*

Italy—Lombardy. **Hutton.**

The cities of Lombardy. By Edward Hutton. London: Methuen & Co., [1912]. Size 8 × 5, pp. x. and 322. *Sketch-map and Illustrations. Price 6s. Presented by the Publishers.*

Italy—Lucca. **Ross and Erichsen.**

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Malta—Ethnology. **Bradley.**

Malta and the Mediterranean race. By R. N. Bradley. London: T. Fisher Unwin, 1912. Size 9 × 6, pp. 336. *Sketch-map and Illustrations. Price 8s. 6d. net. Presented by the Publisher.*

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Andorra, the hidden republic: its origin and institutions, and the record of a journey thither. By Lewis Gaston Leary. London: T. Fisher Unwin, 1912. Size 8 × 5, pp. xiv. and 192. *Sketch-maps and Illustrations. Price 5s. net.*

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Russia. By Sir Donald Mackenzie Wallace. Revised and enlarged edition. London: Cassell & Co., 1912. Size 9½ × 6, pp. x. and 788. *Maps. Price 12s. 6d. net. Presented by the Publishers.*

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Late glacial and post-glacial changes in the Lower Dee Valley. By Leonard Johnston Wills. *Sketch-maps.*

United Kingdom—England. **Wild.**

Holiday walks in the North-Countree. By the Rev. H. Wild. Manchester: John Heywood, [1912]. Size 7½ × 5, pp. 152. *Illustrations. Presented by the Author.*

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The Romanization of Roman Britain. By F. Haverfield. 2nd edit. Oxford: Clarendon Press, 1912. Size 9 × 6, pp. 70. *Sketch-maps and Illustrations. Price 3s. 6d. net. Presented by the Publishers.*

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On the periodicity of the phytoplankton of some British Lakes. By W. West and Dr. G. S. West. *Charts and Illustrations.*

United Kingdom—Lea valley. *Quart. J. Geol. S.* **68** (1912): 213–251. **Warren.**

On the late glacial stage in the valley of the River Lea, subsequent to the Epoch

of river-drift Man. By S. Hazzledine Warren. With reports on the organic remains and on the mineral composition of the Arctic Bed, by various authors. *Illustrations and Sections.*

United Kingdom—Oxford—Meteorology. **Rambaut.**

Results of meteorological observations made at the Radcliffe Observatory, Oxford, in the five years 1906–1910, under the direction of Dr. Arthur A. Rambaut. Vol. 50. Oxford, 1912. Size 10 × 6, pp. xvi. and 130. *Presented by the Radcliffe Trustees.*

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Some geographical problems of the Mid-Pennines. By Dr. Albert Wilmore. *Sketch-maps and Diagram.*

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Rep. British Ass. Portsmouth 1911 (1912): 573–580.

Joint discussion with Sections C and E on the relation of the present plant population of the British Isles to the glacial period. Opened by Clement Reid.

United Kingdom—Scotland. *Scottish G. Mag.* **28** (1912): 295–305. **Kermack.**

The making of Scotland. An essay in historical geography. By W. R. Kermack.

United Kingdom—Scotland—Earthquake. **Gregory.**

T. Geological S. Glasgow **14** (1910–11): 89–114.

The Glasgow Earthquake of December 14, 1910. Presidential address by Dr. J. W. Gregory. *Sketch-maps and Diagrams.*

United Kingdom—Scotland—Floods. **Macnair.**

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The recent floods in Perthshire: their geological lessons. By Peter Macnair.

United Kingdom—Scotland—Survey. **Ordnance Survey.**

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United Kingdom—Wales. **Strahan and Cantrill.**

Memoirs of the Geological Survey. England and Wales. Explanation of sheet 263. The geology of the South Wales coalfield. Part iii. 2nd edit. The country around Cardiff, with a geological bibliography of South Wales and Monmouthshire. By Dr. Aubrey Strahan and T. C. Cantril. London, 1912. Size 9½ × 6, pp. viii. and 158. *Sketch-map, Illustrations, and Sections.*

ASIA.

Arabia. **Wavell.**

A modern Pilgrim in Mecca and a siege in Sanaa. By A. J. B. Wavell. London: Constable & Co., 1912. Size 8½ × 5½, pp. x. and 350. *Map, Plan, and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publishers.*

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Expédition de la Société royale danoise de Géographie en Arabie. Relation préliminaire. Par Barclay Raunkiær.

Arabia. *Petermanns M.* **58** (1912) II.: 84–85. **Raunkiær.**

Die Expedition der Kgl. Dänischen Geographischen Gesellschaft nach Arabien. Vorläufige Uebersicht von Barclay Raunkiær. *Sketch-map and Illustrations.*

A note on this journey appeared in the September number, p. 331.

Arabia—Yemen. *Petermanns M.* **58** (1912) II.: 115–118, 179–181. **Fuad.**

Land und Leute im heutigen Jemen. Von Mehemed Raif Fuad-Bei.

Arabia and Syria. *G. Teacher* **6** (1912): 270–273. **Marten.**

The influence of environment on the peoples of Arabia and Syria. By G. M. Marten.

Armenia—Geology. **Oswald.**

Handb. regionalen Geologie (Steinmann and Wilckens) **5** (1912): Heft 3, pp. 40.

Armenien. Von Felix Oswald. *Map and Sections.*

Central Asia—Glaciation. *La G., B.S.G. Paris* **25** (1912): 431–437. **Allix.**
Les glaciations quaternaires dans la Sibérie méridionale et la Mongolie occidentale. Par A. Allix. *Illustrations and Section.*

China. *Z. Ges. E. Berlin* (1912): 321–365. **Boerschmann.**
Baukunst und Landschaft in China. Von Ernst Boerschmann. *Plans and Illustrations.*

China. *G.Z.* **18** (1912): 185–202, 269–283. **Wegener.**
China und seine jüngste Entwicklung. Von Georg Wegener.

China—Communications. *La G., B.S.G. Paris* **26** (1912): 11–17. **Lapicque.**
Le canal de Sseu-ngen. Communication entre le bassin du Si-kiang et celui du Yang-tseu. Par Capitaine P.-A. Lapicque. *Sketch-maps.*

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Through Shên-kan: the account of the Clark Expedition in North China, 1908–9. By Robert Sterling Clark and Arthur de C. Sowerby. London: T. Fisher Unwin, 1912. Size 10 × 7½, pp. viii. and 248. *Map and Illustrations. Price* 25*s. net. Presented by the Publisher.*

Chinese Empire—Mongolia. **Sapozhnikof.**
Les découvertes du Professeur Sapojnikoff dans l'Altai de Mongolie. (From *Revue Contemporaine*, III^ème^ Année, No. 42, 1912.) St. Petersburg, [1912]. Size 9½ × 6½, pp. 397–408.

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Voyage au Sseu-tch'ouan et aux marches orientales du Tibet. Par G.-Ch. Toussaint.

India—Burma—Gold. *Records Geol. Surv. India* **42** (1912): 37–51. **Brown.**
Report on certain gold-bearing deposits of Mong Long, Hsipaw State, Northern Shan States, Burma. By J. Coggin Brown. *Plans and Illustrations.*

India—Fauna. *Nineteenth Century* **72** (1912): 137–148. **Johnston.**
The protection of the Indian Fauna. By [Sir] H. H. Johnston.

India—Himalaya. **Burrard.**
Survey of India. Professional Paper, No. 12. On the origin of the Himalaya mountains. A consideration of the geodetic evidence. By Colonel S. G. Burrard. Calcutta, 1912. Size 11½ × 8½, pp. 26. *Sketch-maps. Presented by the Surveyor-General of India.*

India—North-East Frontier. **Hamilton.**
In Abor jungles; being an account of the Abor expedition, the Mishmi expedition, and the Miri mission. By Angus Hamilton. London: Eveleigh Nash, 1912. Size 9½ × 6, pp. 352. *Map and Illustrations. Price* 18*s. net. Presented by the Publisher.*

India—North-West Frontier. *Deutsche Rundschau G.* **34** (1912): 370–376. **Bencke.**
Die nordwestliche Grenzprovinz Indiens. (Eine politische-geographische Studie von A. Bencke.) *Map.*

India—Phytogeography. **Duthie.**
Flora of the Upper Gangetic plain, and of the adjacent Siwalik and Sub-Himalayan tracts. By J. F. Duthie. Vol. 2. Calcutta, 1911. Size 7 × 5, pp. 266. *Price* 3*s. Presented by the Royal Botanic Gardens, Calcutta.*

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The new mountain of the year 1910, Usu-san, Japan. By E. B. Bailey. *Sketch-map and Illustrations.*

Korea—Flora. **Nakai.**
J. College Sc. Imp. Univ. Tokyô **26** (Art. I.) (1909): pp. 304; **31** (1911): pp. 574.
Flora Koreana. Par T. Nakai. *Illustrations.*

Malay Archipelago—Borneo. *Scottish G. Mag.* **28** (1912): 361–376. **Cunynghame.**
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Malay Peninsula—Phytogeography. **King and Gamble.**
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66–142; **71** (1902): 46–80; **72** (1903): 111–229; **73** (1904): 47–135; **74** (1910) pp. 908.

Materials for a flora of the Malayan peninsula. By Sir George King and J. Sykes Gamble.

Pamirs—Languages. **Olufsen and Hjuler.**

The second Danish Pamir-expedition, conducted by O. Olufsen. The languages spoken in the western Pamir (Shugnan and Vakhan). By A. Hjuler. Copenhagen, 1912. Size 10½ × 7, pp. 48. *Sketch-map.*

Philippines—Masbate. *Philippine J. Sc.* **6** (1911) Ser. A: 397–426. **Ferguson**

The geology and mineral resources of the Aroroy district, Masbate. By Henry G. Ferguson. *Maps and Illustrations.*

Philippines—Mindanao and Sulu Archipelago. **Smith.**

Philippine J. Sc. (Ser. A) **3** (1908): 473–500; **4** (1910): 345–362; **6** (1911): 359–396.

A geologic reconnaissance of the island of Mindanao and Sulu Archipelago. By Warren W. Smith. *Maps and Illustrations.*

Philippines—Volcano. *National G. Mag.* **23** (1912): 313–339. **Worcester.**

Taal Volcano and its recent destructive eruption. By Dean C. Worcester. *Sketch-maps and Illustrations.*

Russia—Caucasus—Elbruz. **Gerassimov.**

B. Comité Géol. St. Petersbourg **30** (1911): 89–151.

Der Nordwestliche Abhang des Elbrus. Von A. Gerassimow. *Maps and Illustrations.* [In Russian; German *résumé*.]

Russia—Siberia. **Price.**

Siberia. By M. P. Price. London: Methuen & Co., [1912]. Size 9 × 5½, pp. xviii. and 308. *Maps and Illustrations. Price 7s. 6d. net. Presented by the Publishers.*

Mr. Price accompanied Messrs. Carruthers and Miller on their recent expedition, and interested himself chiefly in social and economic questions.

Russia—Siberia—Sikhota-alin. **Romer.**

Bericht über geographische Arbeiten im Gebiete des Sichota-alin-Gebirges. Von E. Romer. (Extrait du *Bulletin de l'Académie des Sciences de Cracovie*, Classe des Sciences Mathématiques et Naturelles, Série A., Sciences Mathématiques, Février 1912.) Cracow, 1912. Size 10 × 6½, pp. 117–129. *Sketch-maps.*

Siam—Survey. **Royal Survey Department.**

Siam. General report on the operations of the Royal Survey Department, Season 1909–10. Bangkok, 1911. Size 13 × 8½, pp. 30. *Index Maps.*

Tian-Shan. *M. k.k. G. Ges. Wien* **55** (1912): 107–126. **Machaček.**

Vorläufige Mitteilungen über die Ergebnisse einer Studienreise in den westlichsten Tian-schan. Von Dr. Fritz Machatschek.

A note on this journey was given in vol. **39**, p. 72.

Turkey—Mesopotamia and Kurdistan. **Soane.**

To Mesopotamia and Kurdistan in disguise, with historical notices of the Kurdish tribes and the Chaldeans of Kurdistan. By E. B. Soane. London: J. Murray, 1912. Size 9 × 6, pp. x. and 422. *Map and Illustrations. Price 12s. net. Presented by the Publisher.*

Turkey—Syria—Archæology. **Mackenzie.**

Palestine Exploration Fund, Annual **1** (1911): 1–40.

The megalithic monuments of Rabbath Ammon at Ammān. By Dr. Duncan Mackenzie. *Plans, Illustrations, and Sections.*

AFRICA.

Abyssinia. *La G., B.S.G. Paris* **26** (1912): 1–6. **Latham.**

Au Sidamo et chez les Gallas Aroussi. Par Hubert Latham. *Sketch-maps.*

Abyssinia. **Montandon.**

Traversée du massif Ethiopien, du désert Somali à la Plaine du Soudan (1909–1911). Etude comparée des zones parcourues et de leurs habitants. Par le Dr. George Montandon. (Extrait du *Globe*, Organe de la Société de Géographie de Genève, Tome li.—Mémoires, 1912.) Geneva, 1912. Size 9½ × 6½, pp. 18. *Sketch-map and Diagrams.*

Africa. **Melland and Cholmeley.**

Through the heart of Africa; being an account of a journey on bicycles and on foot from Northern Rhodesia, past the Great Lakes, to Egypt, undertaken when proceeding home on leave in 1910. By Frank H. Melland and Edward H. Cholmeley. London: Constable & Co., 1912. Size 9 × 6½, pp. xviii. and 306. *Map and Illustrations. Price* 12*s.* 6*d. net. Presented by the Publishers.*

Reviewed in the October number, p. 433.

Africa—Communications. *La G., B.S.G. Paris* **26** (1912): 114–124. **Pierre.**

Relations entre le haut Oubangui et la vallée du Nil. Par Charles Pierre. *Sketch-map.*

Africa—Ethnology. *B.S.G. Italiana* V. **1** (1912): 594–618. **Pettazzoni.**

Civiltà africane. Dal dott. Raffaele Pettazzoni. *Illustrations.*

Africa—Partition. *G.Z.* **18** (1912): 361–387. **Hänsch.**

Die Aufteilung Afrikas. Von Felix Hänsch.

Algeria. **Betham-Edwards.**

In French Africa: scenes and memories. By Miss Betham-Edwards. London: Chapman & Hall, 1912. Size 9 × 5½, pp. x. and 324. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publishers.*

Algeria—Phytogeography. **Rikli and others.**

Vegetationsbilder (Karsten and Schenck) **10** (1912): Pls. 9–18.

Vom Mittelmeer zum Sahara-Atlas. Von M. Rikli, C. Schröter, und A. G. Tansley. *Illustrations.*

Algeria and Tunis—Phytogeography. **Hagen.**

Vegetationsbilder (Karsten and Schenck) **10** (1912): Pls. 1–8.

Das algerisch-tunesische Atlasgebirge. Von Hermann Bessel Hagen. *Illustrations.*

British East Africa—Pemba. *R. Engineers J.* **16** (1912): 145–154. **Craster.**

The survey of Pemba. By Captain J. E. E. Craster. *Diagram and Illustrations.*

See note in the Monthly Record, November, p. 564.

Egypt—Magnetism. **Survey Department.**

Ministry of Finance, Egypt. Survey Department. Magnetic observations made during 1911 at the Khedivial Observatory, Helwan. (Latitude 29° 51′·6 N., longitude 31° 20′·5 E. of Greenwich.) Cairo, 1912. Size 10 × 7, pp. 8 and x.

Egypt—Sinai. *M. k.k. G. Ges. Wien* **54** (1912): 628–641. **Oberhummer.**

Die Sinaifrage. Von Prof. Dr. E. Oberhummer. *Maps.*

Reviews the history of the question in connection with Dr. Musil's claim to have discovered the true Mount Sinai (*Journal*, vol. **36**, p. 612; **38**, p. 620), a claim which the writer appears to consider justified.

Egyptian Sudan—Ethnology. **MacMichael.**

The tribes of Northern and Central Kordofan. By H. A. MacMichael. Cambridge: University Press, 1912. Size 8½ × 5½, pp. xvi. and 260. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publishers.*

Eritrea—Coffee. **Checchi.**

Istituto Coloniale Italiano: Biblioteca di Studi Coloniale, No. 10. Michele Checchi. Il commercio del caffè nella colonia Eritrea. Rome, 1910. Size 9½ × 6½, pp. 22.

French Sudan—Resources. **Meniaud.**

Haut-Sénégal-Niger (Soudan Française). Série d'études publiées sous la direction de M. le Gouverneur Clozel. 2e Série. Géographie économique. Par Jacques Meniaud. 2 vols. Paris: E. Larose, 1912. Size 10 × 6½, pp. (vol. 1) iv. and 396; (vol. 2) 308. *Maps and Illustrations. Price* 20 *fr.*

German East Africa—Fipa. *M. Deuts. Schutzgebieten* **25** (1912): 79–101. **Fromm.**

Ufipa—Land und Leute. Ergebnisse einer in den Jahren 1908 und 1909 ausgeführten Forschungsreise. Von Hauptmann a. D. P. Fromm. *Maps and Illustrations.*

German East Africa—Fisheries. **Peiper.**

Der Pflanzer, Deutsch-Ost Afrika **8** (1812): 278–297.

Die Küsten- und Seefischerei in Deutsch-Ostafrika. Von Dr. Otto Peiper. *Sketch-map and Illustrations.*

German East Africa—Langenburg. *Deutsches Kolonialblatt* **23** (1912): 484–489. **Trotha.**
Zur Landeserkundung im Bezirk Langenburg. Von Hauptmann v. Trotha.

German South-West Africa. *Deutsches Kolonialblatt* **23** (1912): 530–541. **Müller.**
Ein Erkundungsritt in das Kaukau-Veld. Von Hauptmann Müller. *Map and Illustrations.*

Kamerun. *Deutsches Kolonialblatt* **23** (1912): 489–493. **Schwartz.**
Die Mubi-expedition. Nach einem Bericht des Residenten von Adamaua, Hauptmanns Schwartz. *Map.*
Mubi lies on the skirts of the Mandara mountains, north of the upper Benue.

Liberia. *Z. Kolonialpolitik* **13** (1911): 401–430. **Hutter.**
Liberia. Von Hauptmann a. D. Hutter.

Mauritania. *B.S.G. Comm. Paris* **33** (1912): 305–314. **Chudeau.**
Les ressources agricoles de la Mauritanie. Par R. Chudeau.

Morocco. *B.S.G. Marseille* **35** (1911): 223–254, 306–332. **Bardon.**
Deuxième voyage in Maroc. En Chaouïa et chez les Beni-Meskin. Par M. Hippolyte Bardon.

Morocco. **Ladreit de Lacharrière.**
Renseignements Col. Afrique française (1912): 29–46, 111–114, 154–173.
Dans le sud et l'ouest du Maroc. Mission par J. Ladreit de Lacharrière. *Sketch-maps and Illustrations.*

Morocco—Ethnology. *Rev. Ethnographie et Sociologie, Paris* (1912): 89–99. **Segonzac.**
Les populations du Maroc. Par le Marquis de Segonzac. *Illustrations.*

Natal—Vegetation. **Bews.**
The vegetation of Natal. By J. W. Bews. (Reprinted from *Annals of the Natal Museum*, vol. 2, part iii., May, 1912.) [Natal, 1912.] Size 10 × 6½, pp. 253–331. *Map and Illustrations.*

North Africa. *Le Tour du Monde* **18** (1912): 217–288. **Pervinquière.**
Sur les confins de la Tripolitaine de la Méditerranée à Ghadames. Par Léon Pervinquière. *Sketch-map, Plan, and Illustrations.*

North Africa. **Humphreys.**
Algiers, the Sahara, and the Nile. By Rachel Humphreys. London: W. J. Ham-Smith, 1912. Size 7½ × 5½, pp. viii. and 182. *Illustrations. Price 5s. net. Presented by the Publisher.*

Rhodesia. *Scottish G. Mag.* **28** (1912): 337–361. **Larpent.**
The development and progress of Rhodesia. By Gerrard de Hochepied Larpent. *Illustrations.*

Rhodesia—Zimbabwe. *South African J. Sc.* **8** (1912): 325–339. **Hall.**
The present position of the discussion as to the origin of the Zimbabwe culture. By Richard N. Hall.

Sierra Leone—Ethnology. *P.R. Irish A.* **30** (1912): Sect. C, 15–70. **Berry.**
The Sierra Leone cannibals, with notes on their history, religion, and customs. By Major R. G. Berry. *Illustrations.*

Somaliland, British. **Drake-Brockman.**
British Somaliland. By Ralph E. Drake-Brockman. London: Hurst & Blackett, 1912. Size 9 × 5½, pp. xvi. and 334. *Map and Illustrations. Price 12s. 6d. net. Presented by the Publishers.*

South Africa—Agriculture. ——
Farm Lands of the rich South-West. Being notes prepared on behalf of the Cape Peninsula Publicity Association with the object of making more generally known the advantage and good prospects offered to intending settlers by the various branches of farming in the South-West districts of the Cape Province, South Africa. Cape Town, 1912. Size 9½ × 7, pp. 80. *Illustrations.*

South Africa, British. **Fisher.**
Historical Geographies. South Africa. By J. R. Fisher. London: H. Frowde, and Hodder & Stoughton, [1912]. Size 7½ × 5, pp. 190. *Sketch-maps and Illustrations. Price 1s. 6d. Presented by the Publisher.*

South Africa—Geology. **Schwarz.**

South African Geology. By E. H. L. Schwarz. London: Blackie & Son, 1912. Size 7½ × 5, pp. 200. *Maps, Sections, and Illustrations. Price* 3*s.* 6*d. net. Presented by the Publishers.*

Transvaal—Geology. **Hall.**

Mines Department. Geological Survey, Memoir No. 6. The geology of the Murchison Range and District. By A. L. Hall. Pretoria, 1912. Size 10 × 6, pp. 186. *Maps, Plans, Sections, and Illustrations.*

Transvaal—Geology. *T. and P. Geol. S., South Africa* **14** (1912): xxi.-xxx. **Young.**

The problem of the Rand Banket. Anniversary address by the President, Prof. R. B. Young.

Tripoli. *Nineteenth Century* **71** (1912): 1216–1229. **White.**

The Senussi and the Military issue in Tripoli. By Arthur Silva White. *Sketch-map.*

West Africa—Language. **Hopkinson.**

A vocabulary of the Mandingo language as spoken in the Gambia. With Appendices. By Dr. E. Hopkinson. London: West, Newman & Co., [1912]. Size 7½ × 5, pp. xii. and 72. *Price* 6*s. Presented by the Author.*

West African Islands, etc. **Dehérain.**

Henri Dehérain. Dans l'Atlantique: Saint-Hélène aux xxvii^e^ et xviii^e^ siècles; l'archipel de Tristan da Cunha; côtes de l'Afrique australe; les voyages d'Auguste Broussonet au Maroc et aux Canaries. Paris: Hachette et Cie., 1912. Size 7½ × 5, pp. viii. and 244. *Sketch-map. Price* 3 *fr.* 50. *Presented by the Publishers.*

NORTH AMERICA.

Alaska—Geology. *U.S. Geol. Surv. B.* **485** (1912): pp. 138. **Martin and Katz.**

A geologic reconnaissance of the Iliamna Region, Alaska. By G. C. Martin and F. J. Katz. *Maps, Sections, and Illustrations.*

This region lies west of Cook inlet and south of Alaska peninsula.

Alaska—Glaciers. *Petermanns M.* **58** (1912) II.: 78–81, 147–149. **Martin.**

Gletscheruntersuchungen längs der Küste von Alaska. Von Prof. Lawrence Martin. *Map and Illustrations.*

Alaska—Mount Blackburn. *B.S.G. Philadelphia* **10** (1912): 172–176. **Keen.**

The first expedition to Mount Blackburn. By Dora Keen. *Illustrations.*

See note in the August number, p. 217.

Alaska—Survey. *B. American G.S.* **44** (1912): 481–492. **Sargent.**

Progress of Alaskan topographic surveys (by the United States Geographical Survey). By R. H. Sargent. *Maps.*

Canada. **Department of Marine and Fisheries.**

Canada. Her natural resources, navigation, principal steamer lines, and transcontinental railways. Issued by the Department of Marine and Fisheries. Size 11 × 8, pp. 288. *Portrait, Maps, and Illustrations.*

The largest part is taken up with navigation matters, but some general information is also given.

Canada—Coal. *T. Canadian I.* **9** (1912): 99–106. **Dowling.**

Canadian coal resources. By D. B. Dowling. *Diagrams.*

Canada—Geology. **Ries and Keele.**

Canada. Department of mines. Geological Survey Branch. Memoir No. 24–E. Preliminary report on the clay and shale deposits of the Western Provinces. By Heinrich Ries and Joseph Keele. Ottawa, 1912. Size 10 × 6½, pp. 232. *Sketch-maps, Sections, and Diagrams.*

Canada—Ontario—Climatology. *T. Canadian I.* **9** (1912): 149–152. **Stupart.**

The climate of Northern Ontario. By R. F. Stupart.

Canada—Surveys. **Department of the Interior.**

Department of the Interior. Annual report of the Topographical Surveys Branch, 1910–1911. Ottawa, 1912. Size 10 × 6½, pp. vi. and 172. *Illustrations, Maps, and Sections in separate case.*

Labrador—Animal sanctuaries. *Sc. Progress* **6** (1912): 472–495. **Wood.**
Animal sanctuaries in Labrador. By Lieut.-Colonel William Wood.

Mexico—Xochicalco. *B. Pan American Union* **34** (1912): 481–499. **Purdie.**
Ancient temples and cities of the New World.—Xochicalco. By Francis Baillie Purdie. *Sketch-maps, Plan, and Illustrations.*

Mexico—Yucatan—Archæology. *La G., B.S.G. Paris* **26** (1912): 18–32. **Périgny.**
Les ruines de Nakcun. Mission archéologique dans l'Amérique centrale. (1909–1910). Par Comte Maurice de Périgny.

North America—Coast. *Ann. de G.* **21** (1912): 193–212. **Johnson.**
Fixité de la côte atlantique de l'Amérique du Nord. Par Douglas W. Johnson. *Sections.*
See note in the September number, p. 335.

St. Lawrence. *Quarterly Rev.* **216** (1912): 398–419. **Wood.**
The St. Lawrence. By Colonel W. Wood.
The author endorses the somewhat random statement that the St. Lawrence system contains far more than half of all the world's fresh water. He also holds that there is more salt water in its mouth and estuary than in all the mouths and estuaries of all other rivers.

Tierra del Fuego—Ethnology. *B.I.G. Argentino* **25** (1911): 163–226, 247–300. **Dabbene.**
Los indígenas de la Tierra del Fuego. Contribución á la etnografía y antropología de los fueguinos. Por Roberto Dabbene.

United States—Boundary. *U.S. Geol. Surv. B.* **466** (1911): pp. 40. **Marshall.**
Retracement of the boundary line between Idaho and Washington from the junction of Snake and Clearwater rivers northward to the international boundary. By R. B. Marshall. *Map and Illustrations.*

United States—California—Geology. **Louderback.**
Univ. California Publ., B. Geology **7** (1912): 21–38.
Pseudostratification in Santa Barbara county, California. By George Davis Louderback. *Illustrations.*

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The climate of the city and country compared. By J. Warren Smith.
A comparison of twenty-nine years' data for town and country stations 3 miles apart (Columbus, Ohio) shows that the mean temperature, as well as the mean maxima and minima, differ but slightly, though the absolute minima were considerably lower at the country station.

United States—Coast and Geodetic Survey. **Tittmann.**
B. American G.S. **44** (1912): 257–268.
Present activities of the Coast and Geodetic Survey. By O. H. Tittmann. *Illustration.*

United States—Colorado. *Ann. Ass. American Geographers* **1** (1912): 21–83. **Davis.**
The Colorado front range. A study in physiographic presentation. By W. M. Davis. *Sketch-map, Sections, and Illustrations.*

United States—Colorado—Mesa Verde. **Atwood.**
Ann. Ass. American Geographers **1** (1911): 95–100.
A geographic study of the Mesa Verde. By Wallace W. Atwood. *Plan and Illustrations.*

United States—Commercial. **Bureau of Statistics.**
[U.S.] Department of Commerce and Labor. Bureau of Statistics. The foreign commerce and navigation of the United States for the year ending June 30, 1910. Washington, 1911. Size 12 × 9, pp. 1460.

United States—Geology. **Geological Survey.**
United States Geological Survey. Thirty-second annual report of the Director of the United States Geological Survey to the Secretary of the Interior for the fiscal year ended June 30, 1911. Washington, 1911. Size 9½ × 6, pp. 152. *Maps.*

United States—National Parks. **Schmeckebier.**
Popular Sc. Monthly **80** (1912): 531–547.
The national parks from the scientific and educational side. By Laurence F. Schmeckebier. *Illustrations.*

United States—Oregon—Crater Lake. **Diller.**

Geological history of Crater Lake, Oregon. By J. S. Diller. Washington: Department of the Interior, 1912. Size 9½ × 6, pp. 32. *Sketch-maps, Sections, and Illustrations.*

United States—Pennsylvania. **Macfarlane.**

Industrial Philadelphia. From the infant industries of two centuries ago to the giant of to-day. By John J. Macfarlane. (Reprint from *Commercial America*, May 1912.) Philadelphia, 1912. Size 9 × 6, pp. 12. *Diagrams.*

United States—Temperature. *B. Mount Weather Observ.* **4** (1912): 310–341. **Henry.**

The temperature at Mount Weather and adjacent valley stations. By Alfred J. Henry. *Charts.*

United States—Texas. *J.G.* **10** (1912): 277–284. **Simonds.**

Geographic influences in the development of Texas. By Frederick William Simonds. *Sketch-map.*

United States—Yellowstone National Park. **Hague.**

Geological history of the Yellowstone National Park. By Arnold Hague. Washington: Department of the Interior, 1912. Size 9½ × 6, pp. 24. *Map and Illustrations.*

Venezuela—Geology. *Geol. Mag.* v. **9** (1912): 203–210. **Dalton.**

On the geology of Venezuela. By Leonard V. Dalton.

West Indies. *Kew B.* (1912): 166–189. **Hill.**

A visit to the West Indies. By A. W. Hill.

The writer attended the recent agricultural conference as representative of Kew Gardens.

CENTRAL AND SOUTH AMERICA.

Andes. *B.S.G. Italiana*, Ser. V. **1** (1912): 695–716. **Azzi.**

I fenomeni di cattura nella regione delle Ande. Studio di geografia fisica del socio dott. Girolamo Azzi. *Sketch-maps and Sections.*

Concerned with the region between 35° and 45° S.

Brazil. **Dettmann.**

Eduard Dettmann. Das moderne Brasilien in seiner neuesten wirtschaftlichen Entwicklung. Berlin: H. Paetel, 1912. Size 10 × 7, pp. xii. and 488. *Map and Illustrations. Price M.*13.50.

British Guiana. *Timehri* **2** (1912): 13–19. **Crampton.**

The latest journey to Roraima. By Dr. Henry Edward Crampton. *Diagram and Illustrations.*

British Guiana—Boundaries. *United Empire* **3** (1912): 505–513. **Villiers.**

The boundaries of British Guiana. By J. A. J. de Villiers.

Colombia—Earthquake. **Rudolph and Szirtes.**

Beiträge z. Geophysik **11** (1912): 132–199, 207–275.

Das kolumbianische Erdbeben am 31. Januar 1906. Von E. Rudolph und S. Szirtes. *Maps and Diagrams.*

Panama Canal. *United Empire* **3** (1912): 652–661. **Cornish.**

The Panama Canal and its relation to the British Empire. By Dr. Vaughan Cornish. *Sketch-map and Section.*

Panama Canal. **Lindsay.**

Panama and the Canal to-day: an historical account of the canal project from the earliest times, with special reference to the enterprises of the French Company and the United States, with a detailed description of the waterway as it will be ultimately constructed; together with a brief history of the country, and the first comprehensive account of its physical features and natural resources. By Forbes Lindsay. New edition. London: S. Low & Co., 1912. Size 8¼ × 5½, pp. xiv. and 474. *Maps and Illustrations. Price* 12*s.* 6*d. net.*

Peru—Climate. *B. American G.S.* **44** (1912): 598–606. **Arctowski.**

Studies on climate and crops. 3. The "solar constant" and the variations of atmospheric temperature at Arequipa and some other stations. By Henryk Arctowski.

Peru—Lake Parinacochas. *American J. Sc.* **34** (1912): 12–16. **Jamieson and Bingham.**
Lake Parinacochas and the composition of its water. By George S. Jamieson and Hiram Bingham. *Illustrations.*

South America—Geology. **Sefve.**
K. Svenska Vetenskaps-A. Handlingar **48** (1912): No. 6, pp. 186.
Die fossilen pferde Südamerikas. Von Ivar Sefve. *Illustrations.*

Venezuela. **Dalton.**
Venezuela. By Leonard V. Dalton. London: T. Fisher Unwin, 1912. Size 9 × 6, pp. 320. *Map and Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

AUSTRALASIA AND PACIFIC ISLANDS.

Australia—Colonization. *United Empire* **3** (1912): 569–580. **Creed.**
The settlement of "Whites" of tropical Australia. By Hon. J. M. Creed.

Australia—Northern Territory. **Spencer.**
B. Northern Territory, B. No. 2 (1912): pp. 58.
An introduction to the study of certain native tribes of the Northern Territory. By Baldwin Spencer. *Illustrations.*

Australia—Northern Territory. **[Spencer.]**
B. Northern Territory, B. No. 1 (1912): pp. 68.
Summary of report of preliminary scientific expedition to the Northern Territory. [Under the leadership of Prof. Baldwin Spencer.] *Illustrations.*
Chiefly occupied with special reports on Domesticated Animals, Health and Disease, Mosquitoes, and Aborigines.

Hawaii—Kilauea. *Z. Ges. E. Berlin* (1912): 180–203. **Penck.**
Studien am Kilauea (Hawaii). Von Dr. Walther Penck. *Sketch-maps and Illustrations.*

New Guinea—Dutch. *Z. Ges. G. Berlin* (1912): 271–288, 365–377. **Moszkowski.**
Expedition zur Erforschung des Mamberamo in Hollandisch Neu-Guinea. Von Max Moszkowski. *Maps.*
See *Journal*, vol. 37, p. 567. The above paper is accompanied by the traveller's large-scale chart of the river.

New Guinea—Dutch. *Ts. K. Ned. Aardr. Genoots.* **29** (1912): 310–315. **Van der Ven.**
De Wildeman-river (Zuid Nieuw-Guinea). Door F. F. van der Ven. *Map.*
This river is a southern branch of the Eilanden river.

New Guinea, German. **Neuhauss.**
Deutsch Neu-Guinea. Von Prof. Dr. R. Neuhauss. 3 vols. (Bd. I.: Algemeinea; Bd. II.: Völker-Atlas; Bd. III.: Beiträge der Missionare Ch. Keysser, Stolz, H. Zahn, S. Lehner, und G. Bamler.) Berlin: D. Reimer, 1911. Size 11 × 7½, pp. (vol. 1) xvi. and 534; (vol. 2) viii. and 336; (vol. 3) xii. and 572. *Maps and Illustrations. Price M.*90.
Results of a research expedition to German New Guinea.

Victoria—Rainfall. **Bureau of Meteorology.**
Meteorology of Australia. Commonwealth Bureau of Meteorology. Results of rainfall observations made in Victoria during 1840–1910, including all available annual rainfall totals from 1114 stations. Published with the authority of the Minister of Home Affairs under the direction of H. A. Hunt. Melbourne, [1911]. Size 12½ × 10, pp. xxxviii. and 56. *Maps.*

Western Australia—Desert-water. *Geol. Mag.* **9** (1912): 301–304. **Maclaren.**
Notes on Desert-water in Western Australia. "Gnamma Holes" and "Night Wells." By Dr. Malcolm Maclaren. *Sections.*
See note in the Monthly Record, August, p. 219.

POLAR REGIONS.

Arctic—Greenland. *Deutsche Rundschau G.* **34** (1912): 353–365. **Stolberg.**
Bilder aus Grönland. Von Dr. A. Stolberg. *Sketch-map and Illustrations.*
The writer took part in Dr. A. de Quervain's sledge expedition over the inland ice

in 1909, and also in that across Greenland in 1912 (see vol. **39**, p. 616; **40**, p. 566).

Greenland—Botany. *Meddelelser om Grønland* **49** (1912)): pp. 304. **Kruuse.**

Travels and Botanical Investigations in east Greenland. By Chr. Kruuse. *Maps and Illustrations.* (In Danish; English *résumé*.)

Greenland—Cartography. *Meddelelser om Grønland* **48** (1912): pp. 332. **Bjørnbo.**

Cartographia Groenlandica. Af Axel Anthon Bjørnbo. *Maps and Illustrations.*

A careful and scholarly piece of work, by the author of the monograph on Claudius Clavus, reviewed in vol. **36**, p. 686. He has died since completing it.

Greenland—Julianehaab—Geology. **Ussing.**

Meddelelser om Grønland **38** (1912): pp. 426.

Geology of the country around Julianehaab, Greenland. By N. V. Ussing. *Maps, Sections, and Illustrations.*

Spitsbergen. **Raestad.**

La G., B.S.G. Paris **25** (1912): 335–354, 393–412; **26** (1912): 65–98.

Le Spitsberg dans l'histoire diplomatique. Étude de géographie historique. Par Arnold Raestad. *Sketch-maps.*

Spitsbergen—Surface forms. **Meinardus.**

Ueber einige charakteristische Bodenformen auf Spitzbergen. Von Wilh. Meinardus. (Sonderabdruck aus den Sitzungsberichten der Medizinisch- naturwissenschaftlichen Gesellschaft zu Münster i. W., 1912.) Bonn, 1912. Size 8½ × 5½, pp. 42. *Illustrations and Diagrams.*

MATHEMATICAL GEOGRAPHY.

Cartography—Charts. **Groll.**

Alte und neue Seekarten. Von Dr. M. Groll. (Sonder-Abdruck aus der Marine-Rundschau, Berlin, Mai 1912.) Size 9 × 6, pp. 601–616. *Facsimile Charts.*

Cartography—Projections. **Hinks.**

Map projections. By Arthur R. Hinks. Cambridge: University Press, 1912. Size 9 × 5½, pp. xii. and 126. *Maps and Diagrams. Price 5s. net. Presented by the Author.*

Photographic Survey. *Sitzb. K.A.W. Wien*, Abt. IIa., **121** (1912): 3–16. **Kruppa.**

Ueber einige Orientierungsprobleme der Photogrammetrie. Von Erwin Kruppa. *Diagram.*

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Bio-geography. *Petermanns M.* **58** (1912) II.: 65–68, 128–132. **Arldt.**

Die biogeographische Nomenklatur. Von Dr. Th. Arldt.

Coral. *Ann. G.* **21** (1912): 289–293. **Joubin.**

Sur une carte des récifs de coraux. Par le Prof. L. Joubin. *Map.*

Earth-history. **Gregory.**

The making of the earth. By Dr. J. W. Gregory. London: Williams & Norgate. [1911]. Size 7 × 4, pp. 256. *Sketch-maps and Diagrams. Price 1s. net. Presented by the Publishers.*

Erosion. **Bonney.**

The work of rain and rivers. By Dr. T. G. Bonney. (Cambridge Manuals of Science and Literature.) Cambridge: University Press, 1912. Size 6½ × 5, pp. vi. and 144. *Illustrations. Price 1s. net. Presented by the Publishers.*

Geomorphology. **Davis.**

Die erklärende Beschreibung der Landformen. Von William Morris Davis. Leipzig, etc.: B. G. Teubner, 1912. Size 8½ × 6, pp. xviii. and 566. *Illustrations, Sketch-maps, and Diagrams. Presented by the Author.*

Geomorphology. *Riv. G. Italiana* **19** (1912): 355–357. **Azzi.**

Il significato delle geoforme elementari in geomorfogenesi. Del Dott. Girolamo Azzi. *Diagram.*

Geomorphology—Erosion forms. **Darton.**

Geol. Charakterbilder (*Dr. H. Stille*), Heft **11** (1912): 6 *Plates.*

Sandstone pinnacles. By N. H. Darton. *Illustrations.*

Striking examples from the centre and west of the United States.

Geomorphology—Landslides. *Petermanns M.* **58** (1912) II.: 150. **Machatschek.**
Ueber Ursachen und Einteilung einiger Massenbewegungen. Von Prof. Dr. Fritz Machatschek.

Geomorphology—Laterite. *Z. Ges. E. Berlin* (1912): 381–384. **Vageler.**
Lateritbildung und Tropen-Klima. Von P. Vageler.

Geomorphology—Maps. *Petermanns M.* **58** (1912) II.: 72–73. **Gehne.**
Eine neue Methode geomorphologischer Kartendarstellung. Von Dr. Hans Gehne. *Map.*

Oceanography—Indian Ocean. **K. Ned. Meteorologisch Instituut.**
Koninklijk Nederlandsch Meteorologisch Instituut, No. 104. Oceanographische en meteorologische waarenemingen in den Indischen Ocean, Juni, Juli, Augustus (1856–1908). Tabellen. Utrecht, 1911. Size 13 × 10, pp. vi. and 200. *Charts* (in separate Atlas, size 14½ × 23).

Oceanography—Instruments. *B.I. Océanogr. Monaco*, Nr. 230 (1912): pp. 4. **Germain.**
Deux anciens instruments d'Océanographie. Par Louis Germain. *Illustration.*

Oceanography—North sea and Baltic. **Merz.**
Die hydrographischen Verhältnisse der Nord- und Ostsee. Von Dr. Alfred Merz. (Sonderabdruck aus den Verhandlungen des V. internationalen Kongresses für Thalassotherapie in Kolberg, 5–9. Juni, 1911.) Berlin, 1911. Size 9 × 6, pp. 351–357.

Phytogeography. *Ann. Ass. American Geographers* **1** (1911): 3–20. **Cowles.**
The causes of vegetational cycles. Presidential address by Henry C. Cowles.

Phytogeography—Forests. *B.S.R. Belge G.* **36** (1912): 5–18. **Dumas.**
La distribution mondiale des forêts. Par Léon Dumas. *Diagram.*

Ripple-marks, etc. *P.A. Nat. Sc. Philadelphia* **63** (1911): 536–547. **Brown.**
The formation of ripple-marks, tracks, and trails. By Dr. Amos P. Brown. *Sections and Illustrations.*

River-erosion. *Science* **35** (1912): 656–658. **Dellenbaugh.**
Cross-cutting and retrograding of stream-beds. By F. S. Dellenbaugh.

Sedimentation. *B.I. Océanogr. Monaco*, Nr. 229 (1912): pp. 6. **Buen.**
Étude sur la chute des sédiments dans l'eau. Par Rafael de Buen. *Diagram.*

Seismology. *B. Seismological S. America* **1** (1911): 143–148. **Klotz.**
Earthquake epicenters. By Otto Klotz. *Diagrams.*

Seismology. **Stubel.**
Sur la diversité génétique des montagnes éruptives. Par A. Stubel. Traduit de l'allemand par W. Prinz et C. Van de Wiele. Brussels, 1911. Size 13 × 10, pp. 70. *Sketch-maps, Sections, and Illustrations.*

Speleology. **Jeannel and Racovitza.**
Biospeologica, XXIV. Énumération des grottes visitées 1909–1911 (Quatrième série). Par R. Jeannel et E.-G. Racovitza. (From *Archives de zoologie expérimentale, etc.*, 5e sér., tome ix., 1912.) Paris, 1912. Size 9½ × 6¼, pp. 501–668.

Terrestrial Magnetism. *Met. Z.* **29** (1912): 218–230. **Bemmelen.**
Die lunare variation des Erdmagnetismus. Von W. van Bemmelen. *Charts.*

Zoogeography—Fish. **Johansen.**
Meddelelser Komm. Havundersøgelser, Fiskeri **4** (1912): No. 1, pp. 34.
Contributions to the biology of the plaice, with special regard to the Danish plaice fishery. V. The supposed migrations of plaice from the Kattegat and the Belt sea to the true Baltic. By A. C. Johansen. *Maps.*

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Anthropogeography. **Sphyris.**
Kleine Aufsätze. 1: Beziehungen zwischen Anthropogeographie und Statistik; 2: Handelsgeographische Bedeutung und Bearbeitung des statistischen Materials der Güterbewegung. Methodische Winke von Dr. Konst. D. Sphyris. Borna-Leipzig, 1912. Size 8½ × 5½, pp. 32.

Anthropogeography—Forest dwellers. *G.Z.* **18** (1912): 1-15. **Marek.**

Zur Anthropogeographie des Waldes. Von Richard Marek.

Anthropogeography—Towns. *Ann. G.* **21** (1912): 294-311. **Gallois.**

Quelques études de Villes: Vienne, Grenoble, Dijon. Par L. Gallois.

Anthropogeography—Towns. *G. Teacher* **6** (1912): 266-270. **Page.**

The geographical factors controlling the sites of towns. By J. W. Page.

Commercial Geography—Tin. *Smithsonian Misc. Coll.* **58** (1912): No. 2, pp. 408. **Hess.**

Bibliography of the geology and mineralogy of Tin. By Frank L. Hess and Eva Hess.

Disease.

Recent investigations on the etiology of Pellagra. By J. C. (From the *Journal of Tropical Medicine and Hygiene*, vol. 15, September 2, 1912.) London, 1912. Size 11 × 8½, pp. 262-265. *Sketch-map.*

Economic—Cane sugar. **Geerligs.**

The world's cane sugar industry, past and present. By H. C. Prinsen Geerligs. Altrincham (Manchester): N. Rodger, 1912. Size 10 × 7, pp. xvi. and 400. *Maps and Illustrations. Price* 12*s. net. Presented by the Publishers.*

Economic geography—Tropics. *G.Z.* **18** (1912): 305-317, 387-401. **Sapper.**

Ueber den Kulturwert der verschiedenen Landschaftstypen in den Tropen, insbesondere in Mittelamerika. Von Karl Sapper.

Historical. **Hartmann.**

The Gongu-Hrólfssaga: a study in old Norse philology. By Dr. Jacob Wittmer Hartmann. New York: Columbia University Press, 1911. Size 9 × 6, pp. x. and 116. *Presented by the Publishers.*

A special chapter treats of the geographical knowledge displayed in this saga.

Historical—Ptolemy's maps. *Petermanns M.* **58** (1912): II. 61-63. **Fischer.**

Die handschriftliche Ueberlieferung der Ptolemäuskarten. Von Prof. Josef Fischer.

See note in the Monthly Record, *ante*, p. 649.

History of Cartography. *Deutsche G. Blätter* **35** (1912): 29-47. **Wolkenhauer.**

Aus der Geschichte der Kartographie. Von W. Wolkenhauer.

History of Commerce. **Cotes.**

Old-time solutions of the fiscal problem. By Kenelm D. Cotes. (Extract from the *Economic Review*, vol. **22**, July 15, 1912.) London. Size 9½ × 6, pp. 274-289.

History of Exploration. **Heawood.**

A history of Geographical Exploration in the Seventeenth and Eighteenth Centuries. (Cambridge Geographical Series.) By Edward Heawood. Cambridge: University Press, 1912. Size 7½ × 5, pp. xii. and 475. *Maps, Portraits, and Illustrations. Price* 12*s.* 6*d. net. Presented by the Publishers.*

Man in the Tropics. *P.R.S. Victoria* **24** (1912): 353-366. **Lowe.**

The Tropics and Pigment: The physical properties of pigment, and its physiological importance in the protection of living organisms, especially man. By Wm. Lowe.

The writer has no doubt of the beneficial effects of a dark skin in the tropics, which, he holds, must always remain the preserve of the dark races (but *cf. ante*, p. 650).

Tropical colonization. **Kohlbrugge.**

De l'influence du climat tropical sur l'Européen blond. Par J. H. F. Kohlbrugge. (Extrait du *Le Monde*, 1re Année, 1re Decembre, 1911.) Brussels, 1911. Size 10 × 7½, pp. 1031-1046.

BIOGRAPHY.

Rohlfs. **Guenther.**

Gerhard Rohlfs: Lebensbild eines Afrikaforschers. Von Konrad Guenther. Freiburg i. Br.: E. Fehsenfeld, 1912. Size 9 × 6, pp. 352. *Map. Portraits, and Illustrations. Price M.*8.

GENERAL.

Education—Text-Book. **Piggott and Finch.**

Dent's Historical and Economic Geographies. By Horace Piggott and Robert J. Finch. Book I.: World studies. London: J. M. Dent & Sons, 1912. Size 7½ × 5,

pp. xxiv. and 390. *Sketch-maps, Illustrations, and Diagrams. Price* 3*s.* 6*d. Presented by the Publishers.*

Education—Text-Book. **Unstead and Taylor.**

The essentials of world geography, for junior students. By Dr. J. F. Unstead and E. G. R. Taylor. London: G. Philip & Son, 1912. Size 7½ × 5, pp. iv. and 248. *Sketch-maps and Diagrams. Price* 2*s. Presented by the Publishers.*

Bibliography—Manuscripts. **Thompson.**

Illustrations from one hundred manuscripts in the Library of Henry Yates Thompson, consisting of sixty-nine plates illustrating ten MSS. of various countries from the IXth to the XVIth centuries. London: The Chiswick Press, 1912. Size 14 × 11, pp. vi. and 26. *Facsimile illustrations. Presented by H. Yates Thompson, Esq.*

Includes several facsimiles of important early maps.

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EUROPE.

Balkan Peninsula. **Flemming.**

Die Balkanländer. Scale 1: 1,700,000 or 1 inch to 26·8 stat. miles. Berlin and Glogau: Carl Flemming, 1912.

Balkan Peninsula. **Gross.**

The *Daily Chronicle* War Map of the Balkans. By Alexander Gross. Scale 1: 1,850,000 or 1 inch to 29·1 stat. miles. London: The *Daily Chronicle*, 1912. *Price* 6*d. net. Presented by the Publishers.*

Balkan Peninsula. **Keipert.**

H. Kiepert's Generalkarte der Südost Europäischen Halbinsel. Scale 1: 1,500,000 or 1 inch to 23·6 stat. miles. Berlin: Dietrich Reimer (Ernst Vohsen), [1912].

Balkan Peninsula. **K. u. K. Militärgeographisches Institut.**

Uebersichtskarte der nördlichen Balkanländer. Ausgeführt im K. u. K. Militärgeographischen Institut in Wien. 2 sheets. Scale 1: 750,000 or 1 inch to 11·7 stat. miles. Vienna: R. Lechner, [1912].

This map extends from Rumania to Constantinople, and consists of a rearrangement of the sheets of the Austrian Military Geographical Institute map of Central Europe, on the scale of 1: 750,000. The character of railways and roads is indicated, together with much other information, such as swamps, forest-covered areas, fortifications, etc. It is a decidedly useful map at the present time.

Balkan Peninsula. **Philip.**

The *Daily Mail* War Map of the Balkan Peninsula. Scale 1: 2,000,000 or 1 inch to 31·5 stat. miles. London: George Philip & Sons, Ltd., 1912. *Price* 1*s. net. Presented by the Publishers.*

British Isles—England. **Gross.**

Road map of London to the Coast. Scale 1: 316,800 or 1 inch to 5 stat. miles. By Alexander Gross. London: "Geographia" Designing and Publishing Co., Ltd., [1912]. *Price, mounted to fold,* 3*s. net. Presented by the Publishers.*

British Isles—England and Wales. **Ordnance Survey.**

Sheets published by the Director-General of the Ordnance Survey, Southampton, from October 1 to 31, 1912.

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Map of London. Scale 1 : 15,840 or 4 inches to 1 stat. mile. By Alexander Gross. *Price* 1*s. net.* Plan of London. Scale 1 : 7920 or 8 inches to 1 stat. mile. By Alexander Gross. *Price* 1*s. net.* Motorists' Plan of London. Scale 1 : 42,240 or 1·5 inch to 1 stat. mile. By Alexander Gross. *Price, mounted to fold,* 2*s.* 6*d. net.* London : Geographia Designing and Publishing Co., Ltd., [1912]. *Presented by the Publishers.*

British Isles—Manchester. **Gross.**

Plan of Manchester. Scale 1 : 10,560 or 6 inches to 1 stat. mile. By Alexander Gross. London : Geographia Designing and Publishing Co., Ltd., [1912]. *Price* 1*s. net.* *Presented by the Publishers.*

Bulgaria. **Peucker.**

Generalkarte des Königreiches Bulgarien. Unter Benützung von Originalmaterialien bearbeitet von Dr. Karl Peucker. II. erweiterte Ausgabe. Scale 1 : 864,000 or 1 inch to 13·6 stat. miles. Vienna : Artaria & Co., [1912]. *Price* 3 *Kr.*

Central Europe. **K. u. K. Militärgeographisches Institut.**

Uebersichtskarte von Europa. Scale 1 : 750,000 or 1 inch to 11·7 stat. miles. Sheets : G. 7, Banjaluka ; G. 8, Cattaro ; H. 7, Orsova ; H. 8, Skoplje ; J. 7, Bucuresti (Bukarest) ; J. 8, Adrianopel. Vienna : K. u. K. Militärgeographisches Institut, 1911–12. *Price* 2 *Kr. each sheet.*

Central Europe. **K. u. K. Militärgeographisches Institut.**

Karte von Mitteleuropa. Scale 1 : 300,000 or 1 inch to 4·7 stat. mile. Sheets : 36° 42°, Cattaro ; 36° 43°, Ragusa ; 37° 44°, Zvornik ; 37° 45°, Mitrowitz ; 38° 44° Užice ; 38° 45°, Belgrad ; 39° 40°, Janina ; 39° 44°, Kragujevac ; 40° 40°, Larisa ; 40° 41°, Vodena ; 40° 42°, Egri Palanka ; 41° 41, Saloniki ; 41° 42°, Džumaja ; 41° 43°, Sofia ; 42° 42°, Plovdiv (Philippopel) ; 43° 41°, Xanthi ; 43° 43°, Trnovo ; 44° 42°, Adrianopel ; 44° 43°, Sliven (Slivno) : 45° 42°, Burgaz. Vienna : K. u. K. Militärgeographisches Institut, 1911–1912. *Price* 1.20 *Kr. each sheet.*

These are new editions.

Central Europe. **Sifton, Praed & Co.**

Sifton, Praed's map of Central Europe to illustrate the Napoleonic Campaign of 1805. Scale 1 : 3,500,000 or 1 inch to 55·2 stat miles. London : Sifton, Praed & Co., [1912]. *Price* 1*s.* 6*d. Presented by the Publishers.*

One of a series of maps now being published to illustrate important historical epochs and events. It consists of a map of Central Europe in black and white, with brown hill shading, and shows important places in connection with the campaign of 1805, with insets giving the routes of forces under the command of Napoleon's officers : (1) from the Channel to the Rhine ; (2) from the Rhine to Ulm ; (3) position of Forces six days before the battle of Austerlitz ; and (4) map of the battle of Austerlitz, December 2, 1805. As regards the construction, it would have been advisable to have brought out the coast-line more clearly, while the black town marks might with advantage have been somewhat less pronounced and more in character with the type in which the name is written.

France. **Ministre de l'Intérieure.**

Carte de la France dressée par ordre du Ministre de l'Intérieur. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Sheets : VIII.–21, Challans ; XII.–13, Vimoutiers ; XVI.–12, Pontoise ; XVIII.–16, Sens ; XIX–20, St. Saulge ; XIX.–29, Saugues ; XX.–24, Bourg ; XXIII.–26, La Tour du Pin ; XXVI–15, St. Dié ; XXVI.–16, Gérardmer ; XXVI.–26, Ste. Foy ; XXVI.–32, St. Martin-Vésubie. Paris : Hachette et Cie, 1912. *Price* 0.80 *fr. each sheet.*

These are new editions.

Greece. **Greek General Staff.**

Map of Greece. [In Greek.] Scale 1 : 75,000 or 1 inch to 1·2 stat. mile. Sheets :

Agyia; Tsagesi. Athens: Greek General Staff; Vienna: K. u. K. Militärgeographisches Institut, 1910–1911.

Two sheets of the new survey map of Greece, which was noticed in the *Geographical Journal* for August, 1911. They include a part of the east coast of Larissa in the neighbourhood of Agyia, from 39°-30′ to 40° N. lat.

Mediterranean. **Bacon.**

Bacon's Excelsior map of the Mediterranean Lands. Scale 1 : 4,067,712 or 1 inch to 64·2 stat. miles. 3 sheets. London: G. W. Bacon & Co., Ltd., 1912. *Presented by the Publishers.*

A wall map, coloured to show heights of land and depths of water on the layer system. Names of rivers, lakes, seas, and important places are given, and in many instances the ancient names as well.

Norway. **Gleditsch.**

Aschehougs Lommeatlas over Norge. Ved K. Gleditsch. Christiania: H. Aschehoug & Co., 1911.

A new edition of a useful little pocket atlas of Norway. The whole country, except the extreme north, is represented on fifteen sheets of maps on the scale of 1 : 1,000,000, while Finmark is on the scale of 1 : 2,000,000. Maps of special districts and plans of towns, of which there are altogether seven, are on enlarged scales. There is a good index to places, several views, and a few pages of text.

Norway. **Norges Geologiske Undersøkelse.**

Geologisk Kart over Kongeriget Norge. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Sheet: Söndre Fron. Christiania: Norges Geologiske Undersøkelse, 1911. *Presented by the Norwegian Geographical Institute.*

Norway. **Norges Geografiske Opmaaling.**

Topografisk Kart over Kongeriket Norge. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Sheets: L. 11, Nordfold; M. 8, Harstad; X. 3, Lebesby. 38 C. Tönset. Christiania: Norges Geografiske Opmaaling, 1911–12. *Presented by the Norwegian Geographical Institute.*

Russia. **Loutouguine.**

Carte géologique détaillée du bassin du Donetz. D'après les explorations faites sous la direction de L. Loutouguine. Scale 1 : 42,000 or 1·5 inch to 1 stat. mile. Sheet VI.–21. St. Petersburg: A. Ilyin, 1911. *Presented by the Comité Géologique, St. Petersburg.*

This is a continuation of the map noticed in the *Geographical Journal* for October, 1911.

Russia. **Semenof-Tian-Shansky.**

Commercial-industrial map of European Russia. [In Russian.] By V. P. Semenof-Tian-Shansky. Scale 1 : 680,000 or 1 inch to 10·7 stat. miles. 9 sheets. St. Petersburg: Ministry of Commerce and Industry, [1912].

This map accompanies an official report with which it will be reviewed.

ASIA.

Asia Minor. **Kiepert.**

Karte von Kleinasien bearbeitet von Dr. Richard Kiepert. Zweite berichtigte Ausgabe. Scale 1 : 400,000 or 1 inch to 6·3 stat. miles. Sheet B 1, Aivalyk. Berlin: Dietrich Reimer (Ernst Vohsen), 1912.

This sheet includes the Dardanelles, Mytilini Island, and the adjacent part of the mainland as far as 28° 10′ E. longitude.

AFRICA.

Africa. **Bartholomew.**

Central and South Africa. By J. G. Bartholomew, LL.D., F.R.G.S. Scale 1 : 5,000,000 or 1 inch to 78·9 stat. miles. Edinburgh: John Bartholomew & Co., 1912. *Price, mounted on cloth, 3s. net. Presented by the Publishers.*

This is a new edition.

Africa. **Survey Office, Khartum.**

Africa. Scale 1 : 250,000 or 1 inch to 3·9 stat. miles. Anglo-Egyptian Sudan. Sheets: 45–J, Bayuda; 55–H, Gedaref; 65–K, Achwang; 65–P, Mesha el Rek;

66–I, Lake No. Khartum: Survey Office, 1912. *Price* 10 *P.T. each sheet. Presented by the Director of Surveys, Khartum.*

AMERICA.

Brazil. **Schnoor.**

Mappa da Viação Ferrea do Brazil e suas ligações com as rêdes ferreas de Bolivia, Perú e Republicas do Prata de accordo cam os ultimos documentos e Mappas Geographicos em 1911. Organisado pelo Engenheiro Emilio Schnoor para a Companhia E. F. Victoria à Minas. Scale 1 : 5,000,000 or 1 inch to 78·9 stat. miles. London agents: G. W. Bacon & Co., Ltd. *Presented by Messrs. G. W. Bacon & Co., Ltd.*

A general map of Brazil, showing railways working, under construction, and projected. For the sake of the connections of the railways the map also includes, in outline, Bolivia, south-eastern Peru, and northern Chile.

British Columbia. **Vancouver Map and Blue Print Co.**

Indexed Guide map of the City of Vancouver and Suburbs. Scale 1 : 40,000 or 1·6 inch to 1 stat. mile. Compiled and published by the Vancouver Map & Blue Print Co., Ltd., 1911.

A useful but not very clearly executed plan of Vancouver, printed in colours, with an index to sheets, which adds considerably to its value for purposes of general reference.

Canada. **Bacon.**

Gage's New Excelsior Map of the Dominion of Canada. Specially prepared by G. W. Bacon & Co., Ltd. Scale 1 : 2,650,000 or 1 inch to 41·8 stat. miles. London: G. W. Bacon & Co., Ltd. Toronto: W. J. Gage & Co., 1912. *Price* 25*s.*

This is an entirely new map of Canada, and considerable care has been taken with its production. The projection, which is a modified conical, has been carefully computed and drawn on the principle that the meridians are their true spheroidal lengths, and the total scale errors on the limiting parallels is equal to that of the parallel near the centre of the map. The latest material has evidently been used in the construction of the map, and on the whole it will prove very useful as a wall-map for general reference in offices of commercial houses and elsewhere. Railways have received special attention, and are shown in red. The relief, in brown shading, is not satisfactorily treated, and fails to bring out the characteristic features. The colouring of political divisions is somewhat overdone, and owing to this and other causes the map has a rather crude appearance which it does not deserve.

Canada—Quebec. **Klotz.**

Magnetic Declination observed in 1909 accompanying report of Dr. Otto Klotz to the Chief Astronomer. Scale 1 : 2,217, 700 or 1 inch to 35 stat. miles. Ottawa: Department of the Interior, Astronomical Branch, 1910.

Shows by red lines and arrows the latest determined values of the magnetic declination at Ottawa, Quebec, and thirty other places on the northern shore of the Gulf of St. Lawrence as far as the Strait of Belle Isle. The names of these places are printed in red on the map, and the arrow is drawn through the places at the proper angle of magnetic declination with the true meridian, in addition to which the declination is given on the arrows in figures. It is interesting to note that, while at Ottawa the magnetic needle points 30° 1′ to the west of the true north, at the Strait of Belle Isle the angle is 38° 29′ N., there being a constant increase between the two positions.

Canada. **Surveyor-General's Office, Ottawa.**

Sectional Map of Canada. Scale 1 : 190,080 or 1 inch to 3 stat. miles. Sheets: 66, Medicine Hat, revised to June 20, 1912; 117, Red Deer Forks, revised to March 11, 1912; 118, Rush Lake, revised to August 26, 1912; 166, Sounding Creek, revised to July 15, 1912; 218, Saskatoon, revised to July 12, 1912. Ottawa; Surveyor-General's Office, 1912. *Presented by the Department of the Interior, Topographical Surveys Branch, Ottawa.*

Central America. **Mendioroz.**

Atlas de Centro-America. Editado por Luciano Mendioroz. Masaya: Enrique Castillo, 1912.

There is so little cartographical material in existence of the States of Central America that this little atlas, although very sketchy in appearance and rough in style

of production, will doubtless be welcomed. In many parts practically no survey work has been done, and such maps as there are are made up of the roughest material. The atlas consists of seventy-eight sheets of maps, which include the whole of Guatamala, Salvador, Honduras, Nicaragua, and Costa Rica; and show principal roads and tracks, railways existing and proposed, relative size of towns, and other general information. The attempt is a praiseworthy one, and it is only to be regretted that no better material exists for the production of an atlas of this part of the world.

North America. **U.S. Geological Survey.**

Geologic map of North America. Compiled by the United States Geological Survey in co-operation with the Geological Survey of Canada and Instituto Geologico de Mexico, under the supervision of Bailey Wallis and George W. Stose. Scale 1 : 5,000,000 or 1 inch to 25·2 stat. miles. 4 sheets. Washington: U.S. Geological Survey, 1911.

This map is in four sheets, each of which measures 37 × 28 inches. The various geological formations are shown by colours in the usual manner, from the latest material. It forms Professional Paper No. 71 of the U.S. Geological Survey.

South America. **Bartholomew.**

Commercial map of South America. By J. G. Bartholomew, LL.D., F.R.G.S. Scale 1 : 10,000,000 or 1 inch to 157·8 stat. miles. Edinburgh: John Bartholomew & Co., 1912. *Price, mounted on cloth, 3s. net. Presented by the Publishers.*

A new edition of a useful general map.

ARCTIC REGIONS.

Spitsbergen. **Isachsen.**

Green Harbour av Isachsens norske Spitsbergenekspedition 1909–10. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Christiania: Norges Geografiske Opmaaling, 1912. *Presented by the Norwegian Geographical Institute.*

GENERAL.

World. **Bacon.**

Bacon's Library and Commercial Route Chart of the World on Mercator's Projection. By G. W. Bacon, F.R.G.S. Equatorial scale 1 : 35,000,000 or 552·4 stat. miles. 2 sheets. London: G. W. Bacon & Co., Ltd., 1912. *Presented by the Publishers.*

A general, and not very distinct, map of the world, with the Pacific ocean in the centre and the whole of the Atlantic given twice over. The attempt at showing relief is very unsatisfactory, and the crudely drawn mountain ranges might with advantage have been left out altogether, specially as they are in many cases decidedly misleading and out of date. For instance, while a most prominent range is shown as running through Eastern Siberia and Kamchatka, the Himalaya and other great mountain systems are but feebly represented. Steamer lines, with distances between ports, and important railways are shown. There are three interesting little inset isochronic charts of the world, showing the shortest time in which any place can be reached by the quickest route from London, New York, and Melbourne. The map is intended to be mounted and hung on a wall for office use.

World. **Bartholomew and Lyde.**

A School Economic Atlas. By J. G. Bartholomew, LL.D., with an Introduction by L. W. Lyde, M.A. Revised edition. Oxford: Clarendon Press, 1912. *Price 2s. 6d. net. Presented by the Publishers.*

In this revised edition Prof. Lyde has added slightly to the notes in the introductory letterpress, and made one or two alterations in the diagrams and maps. For instance, No. 17, the diagram showing trade of the British possessions, is now exchanged for a sheet of black-and-white diagram maps showing countries of other colonial powers, drawn on a uniform scale of 1 : 60,000,000, which forms a useful companion to that on the opposite page, No. 16, showing countries of the British Empire on the same scale. Nos. 26–27, 28–29 are two new maps, one an orographical map of Central Europe, and another a route chart of the Mediterranean sea.

World. **Brouckner and Groll.**

Der erste preussische Seeatlas 1749 "Nouvel atlas de Marine composé d' une Carte Générale, et de XII. Cartes Particulières, qui representent Le Globe

Terrestre jusqu'au 82e Degré du Coté du Nord, et jusqu'au 60e du Coté du Sud. Le tout dressé sur les Observations les plus Nouvelles et les plus approuvés. Dedié a Sur Excellence Mgr. le Comte de Schmettau, Gen. Feld-Marechall, Grand-Maitre d'Artillerie et Chevalier de l'Orde de l'Aigle noir, etc. qui a fourni pour cet atlas toutes les Cartes et toutes les Mémoires nécessaires: par son très humble et très obeissant Serviteur Isaac Brouckner, Géographe de S.M.T.C. et Correspondant de l'Academie Royale des Sciences de Paris. Approuvé par l'Academie Royale des Sciences a Berlin l'Année 1749." Herausgegeben von Dr. M. Groll. Berlin: Dietrich Reimer (Ernst Vohsen), 1912. *Price* 30 *M.*

This is a photo-lithographic reproduction of the sheets of the Nouvel Atlas de Marine prepared by the geographer Isaac Brouckner, by order of Fieldmarshall Count Samuel von Schmettau, who did so much in Prussia to raise the level of the scientific undertakings, not only theoretical but practical, of the Berlin Royal Academy of Sciences during the eighteenth century. In order that this atlas might be as complete as possible, Count von Schmettau placed at Brouckner's disposal all the sheets and memoirs that were available, which were dealt with in a masterly way by the geographer, with the result that a most creditable marine atlas for the time was prepared, which certainly deserves to be designated as the first Prussian marine atlas. This atlas has now been reproduced under the editorship of Dr. M. Groll, who has also written an interesting note to accompany it, to which he has appended a list of the other cartographical works undertaken by the academy about the same period. Dr Groll states that only three copies of the original atlas are known to him to be in existence, one of which is in the Congress Library at Washington, the second at the Nordenskiöld Library at Helsingfors, and the third in the library of the Grandduke at Weimar; and it is from this last of these that his facsimile has been taken.

The atlas consists of a chart of the whole world on Mecator's projection in twelve sheets, measuring 18 inches by 20½ inches each, which is preceded by a general chart to serve as an index, with the different sheets of the larger chart marked out upon it. In the original the border of the charts is coloured yellow, the coasts green, and the compass roses blue and red; but, of course, in the photographic reproduction these colours have been lost. The original also contained numerous manuscript and unpublished cartographical and literary notices. The work marked an important epoch in the publication of marine atlases in Germany.

World. **Debes.**

E. Debes' Neuer Handatlas über alle Teile der Erde in 65 Haupt- und über 130 Nebenkarten mit alphabetischem Namenverzeichnis. 4. Stark vermehrte und verbesserte Auflage. Lieferungen 23, 24, 25, 26, 27 u. 28. Leipzig: H. Wagner & E. Debes, 1912. *Price* 80 *Pf. each part.*

These parts contain the following maps: Lieferung 23: No. 44, Ost-Asien, 45 Afrika. Lieferung 24: Nr. 11, Mittelländisches Meer, 26a, Ungarn, Galizien und Bukowina. Lieferung 25: Nr. 46–48, Atlasländer, Kapländer und Nilländer, 59 Mittleres Süd-Amerika. Lieferung 26: Nr. 41, Palästina, 58 Süd-Amerika. Lieferung 27: Nr. 10, Weltverkehr und Kolonialbesitz, 57 Mittel-Amerika. Lieferung 28: No. 49, West-Afrika, 50 Äquatoriales Afrika.

World. **Unstead and Taylor.**

Philips' comparative series of Wall Atlases. Edited by J. F. Unstead, M.A., D.SC., and E. G. R. Taylor, B.SC. With explanatory Handbooks for Teachers. British Isles: scale 1 : 1,500,000 or 1 inch to 23·6 stat. miles. 8 maps. Asia: scale 1 : 12,000,000 or 1 inch to 189·4 stat. miles, 8 maps. London: George Philip & Son, Ltd., 1912. *Price* 27*s.* 6*d. each set. Presented by the Publishers.*

These two sets of school wall maps are a continuation of the series now in course of publication by Messrs. G. Philip & Son, the first of which, Europe, was noticed in the *Geographical Journal* for February last. Each set consists of eight coloured wall maps measuring 42 inches by 34 inches, mounted on linen with brass eyelet-holes for hanging, and folded in a cardboard case. All the maps in one set are on the same scale, and by means of clearly selected colours and suitable symbols exhibit the various features in a bold and diagrammatic style, suitable for school use. A comparative set of maps of this kind has much to commend it from an educational point of view, and the scheme is being well carried out. The subjects dealt with in each set are as follows:—British Isles: Relief of Land and Communication; Political and Communication; Climate—Rainfall, Isobars, and Winds; Climate—Temperature; Agriculture and Fishing; Industrial; Geological; Density of Population. Asia: Relief of Land and Communication; Political; Climate—Summer Conditions; Climate—Winter Conditions; Temperature; Natural Vegetation; Economic; Density of Population.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, from September 29 to November 2, 1912. *Presented by the Hydrographer, Admiralty.*

New Charts—No. 2175, England, south coast: Poole bay, 4*s*. 1594, Scotland, west coast: Kyle Rhea and the north part of Sleat sound, 3*s*. 2593, North sea: Terschelling zeegat to Friesche zeegat, 4*s*. 2812, Africa, west coast: Lagos harbour, 3*s*. 739, India, west coast: Boria Pagoda to Malvan, 4*s*. 3773, Australia, north-west coast: Cape Leveque to Lacepede islands, 3*s*. 3774, Australia, north-west coast: Lacepede islands to Roebuck bay, 4*s*. 1698, England, south coast: Dover harbour, 3*s*. 2451, England, south coast: Owers to Dungeness, 3*s*. 2255, England, south coast: Weymouth and Portland, 3*s*. 2268, England, south coast: Portland harbour (Plan: Portland coaling piers), 3*s*. 2507, Scotland, west coast: Ardnamurchan point to Loch Brittle (Bhrea'al), Skye, including the Small isles and Sleat sound, 3*s*. 1094, England, east coast: Outer Gabbard to Outer Dowsing, 3*s*. 102, England, east coast: Pakefield gatway to Orfordness (Plan: Southwold harbour), 2*s*. 6*d*. 109, England, east coast: Entrance to the river Humber (Plan: Grimsby road), 3*s*. 1407, Scotland, east coast: St. Abbs head to Aberdeen, 3*s*. 2115, Baltic entrance: The Sound (Plans: Helsingör harbour, Helsingborg), 3*s*. 2612, France, north coast: Fécamp to Boulogne; Plans added: Fécamp, Tréport, 3*s*. 2360, Baltic, Sweden: Falsterbo point to Kalmar sound (Plans: Ystad, Rönne harbour, Karlshamn, Ertholms or Christiansö); New plan of Simrishamn on this sheet, 3*s*. 2300, Gulf of Bothnia: Stiernö point to Fiäderägg and Stur (Stor) fiärd to Gamle Karlebyu (Gamla Karleby), 3*s*. 2073, France, north coast: Cape Barfleur to Courseulles; Plan added: Port Barfleur, 3*s*. 2158*b*, Mediterranean sea, eastern sheet, 3*s*. 449, Mediterranean sea, 4*s*. 1600, Mediterranean, Greece: Gulf of Corinth: Plans added: Corinth roads, Kalamaki bay, 3*s*. 1274, Gulf of Mexico: Tortugas cays to Cape San Blas; Plan added: St. Marks river, 3*s*. 1223. Africa, south coast: Port Alfred (Kowie river), 2*s*. 597, Africa, east coast: Delagoa bay to Cape Guardafui, including Mozambique channel and Madagascar island, with the off-lying islands and reefs, 4*s*. 748*a*, The Indian ocean, southern portion, 5*s*. 753, Entrance of the Persian gulf, 3*s*. 1235, Persian gulf: Mouth of the Euphrates, Shatt al Arab and Bahmishir river (Plans: The bar below Muhammera, Karun river, Al Basra anchorage). Plan added: Abadan anchorage, 3*s*. 2720 Gulf of Siam: Koh Ta kut to Cape Liant (Plans: Bang Pak Kong river, Koh Kram bay), 3*s*. 1263, China sea, 3*s*. 2660*a*, China sea, southern portion, Western sheet, 3*s*. 1342, Cochin China: Fan rang bay to Tong king gulf (Plans: Entrance to the Hué river or Thruong thien, Tourane bay); New plan of Port Tourane on this sheet, 3*s*. 1965, China sea: Kua lakh to Kao tao islands, 3*s*. 1169, China sea: Approaches to Port Courbet and interior channels between Nui kak ba and Pak ha mun (Plan: Pak ha mun anchorage), 4*s*. 3419, Australia, north coast: Goode Island anchorage, 2*s*. 3484, New Zealand, South island: Awarua or Bluff harbour, 3*s*. 2683, Pacific ocean, 5*s*.

Atlantic. **U.S. Hydrographic Office.**

Pilot chart of the North Atlantic Ocean, October, 1912; ditto, South Atlantic Ocean, December, 1912, January and February, 1913. Washington: U.S. Hydrographic Office, 1912. *Presented by the U.S. Hydrographic Office.*

Atlantic, North. **U.S. Weather Bureau.**

Meteorological chart of the North Atlantic Ocean, November, 1912. Washington: Department of Agriculture, U.S. Weather Bureau, 1912. *Presented by the U.S. Weather Bureau.*

Atlantic, North, and Mediterranean. **Meteorological Office.**

Monthly Meteorological charts of the North Atlantic and Mediterranean, November, 1912. London: Meteorological Office, 1912. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **Meteorological Office.**

Monthly Meteorological charts of the Indian Ocean, November, 1912. London: Meteorological Office, 1912. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **U.S. Hydrographic Office.**

Pilot chart of the Indian Ocean, December, 1912. Washington: U.S. Hydrographic Office, 1912. *Presented by the U.S. Hydrographic Office.*

Indian Ocean. **U.S. Weather Bureau.**

Meteorological chart of the Indian Ocean, November, 1912. Washington: Department of Agriculture, U.S. Weather Bureau, 1912. *Presented by the U.S. Weather Bureau.*

North America—Great Lakes. **U.S. Weather Bureau.**

Meteorological chart of the Great Lakes, November, 1912. Washington: Department of Agriculture, U.S. Weather Bureau, 1912. *Presented by the U.S. Weather Bureau.*

Pacific. **U.S. Hydrographic Office.**

Pilot chart of the North Pacific Ocean, December, 1912; ditto, South Pacific Ocean, December, 1912, January and February, 1913. Washington: U.S. Hydrographic Office, 1912. *Presented by the U.S. Hydrographic Office.*

Pacific, North. **U.S. Weather Bureau.**

Meteorological chart of the North Pacific Ocean, November, 1912. Washington: Department of Agriculture, U.S. Weather Bureau, 1912. *Presented by the U.S. Weather Bureau.*

PHOTOGRAPHS.

Lohit Brahmaputra. **Williamson.**

Six photographs of the Lohit Brahmaputra, taken by Noel Williamson, Esq. *Presented by Lieut.-Colonel O. C. Williamson-Oswald, R.A.*

These photographs were taken by the late Mr. Noel Williamson on his expedition to the Lohit Brahmaputra, just previous to the Abor expedition upon which he lost his life. The journey was described in the *Geographical Journal* for June, 1911.

(1) Cultivated fields at Walong; (3) Tibetan log hut at Walong; (4) Double rope bridge across the Lohit, north of Sat confluence; (6) Boulder at Menilkrai, which is claimed by the Chinese as the boundary between India and China, showing small stones on top placed there by the missionaries Messrs. Krick and Bourg, who were afterwards murdered at Sama in 1854.

Mesopotamia. **Willcocks.**

Twenty-two photographs of Lower Mesopotamia, taken by Sir William Willcocks, K.C.M.G., 1911. *Presented by Sir William Willcocks.*

These photographs were taken by Sir William Willcocks while engaged upon surveys in connection with the irrigation works now in progress in Mesopotamia.

(1) Rahalia Oasis, fresh-water spring; (2) Fishing in rapids below barrage; (3) Ruins at Akkar Kuf; (4) An ancient Sakia on Tigris now left high and dry; (5 and 6) Snow in Baghdad, January, 1911; (7) Tower built in imitation of the Tower of Babel; (8) Oasis near Habbania escape; (9) Breach in the Hindie barrage; (10 and 11) The new Hindie barrage; (12–22) Hindie barrage, falling towers for closing breach.

Persia. **Spencer.**

Twelve photographs of the Mekran coast, Persia, taken by Captain Spencer, R.A., 1911. *Presented by Lieut.-Colonel O. C. Williamson-Oswald, R.A.*

A set of small photographs measuring 3 inches by 3¼ inches.

(1) Landing at Gulag at the mouth of the Rapsh; (2) Gulag village and wells; (3) An oasis on the Rapsh; (4) The valley of the Rapsh, halfway to Bint; (5 and 6) Oasis at Bint; (7) Beach at Sirik, mouth of the Gaz river; (8) Sarzeh pass where the Gaz enters the coast plain; (9) Hot springs at Sarzeh; (10) Gwaj oasis on Gaz river; (11) Gorge in upper Gaz river; (12) Pushak defile of Gaz river.

N.B. It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

The general
Map of the J
Geological
The inset is
the Geologi

Published by the Royal Ge

JAPAN

to illustrate the paper by

ELLEN CHURCHILL SEMPLE.

Scale 1: 5,000,000 or 1 Inch = 78·9 Statute Miles.

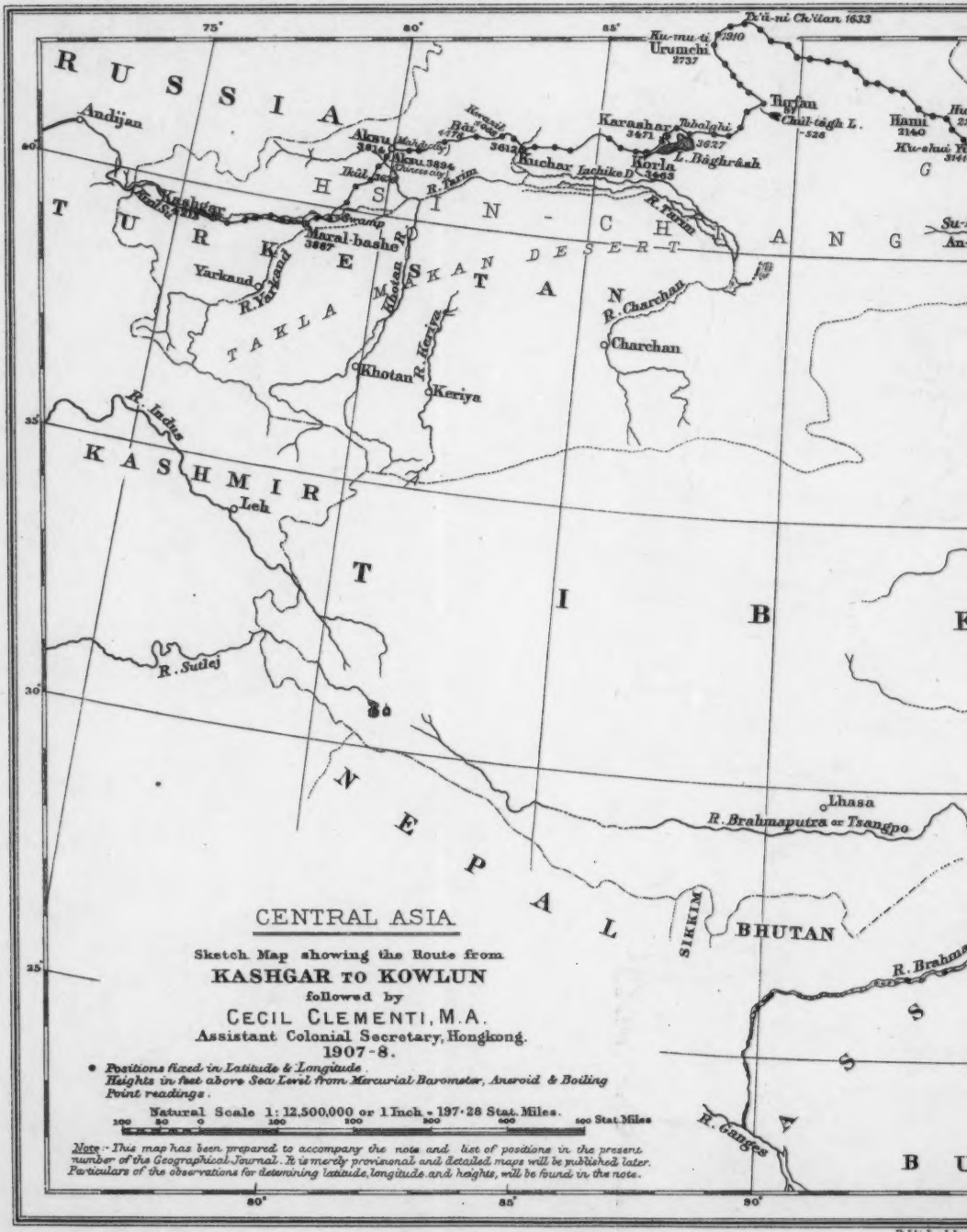
50 0 50 100

Reference.

	6,000 Feet.
	3,000 "
	1,500 "
	300 "
	0 "

Note

The general map has been prepared from the Topographical Map of the Japanese Empire, published by the Imperial Geological Survey of Japan. Scale 1: 1,000,000
The inset is from the Nikko (Topographical) sheet of the Geological Survey of Japan, Scale 1: 200,000



CENTRAL ASIA.

Sketch Map showing the Route from

KASHGAR TO KOWLUN

followed by

CECIL CLEMENTI, M.A.

Assistant Colonial Secretary, Hongkong.

1907-8.

* *Positions fixed in Latitude & Longitude.*
Heights in feet above Sea Level from Mercurial Barometer, Aneroid & Boiling Point readings.

Natural Scale 1: 12,500,000 or 1 Inch = 197·28 Stat. Miles.

100 50 0 100 200 300 500 Stat. Miles

Note:- This map has been prepared to accompany the note and list of positions in the present number of the Geographical Journal. It is merely provisional and detailed maps will be published later. Particulars of the observations for determining latitude, longitude and heights, will be found in the note.

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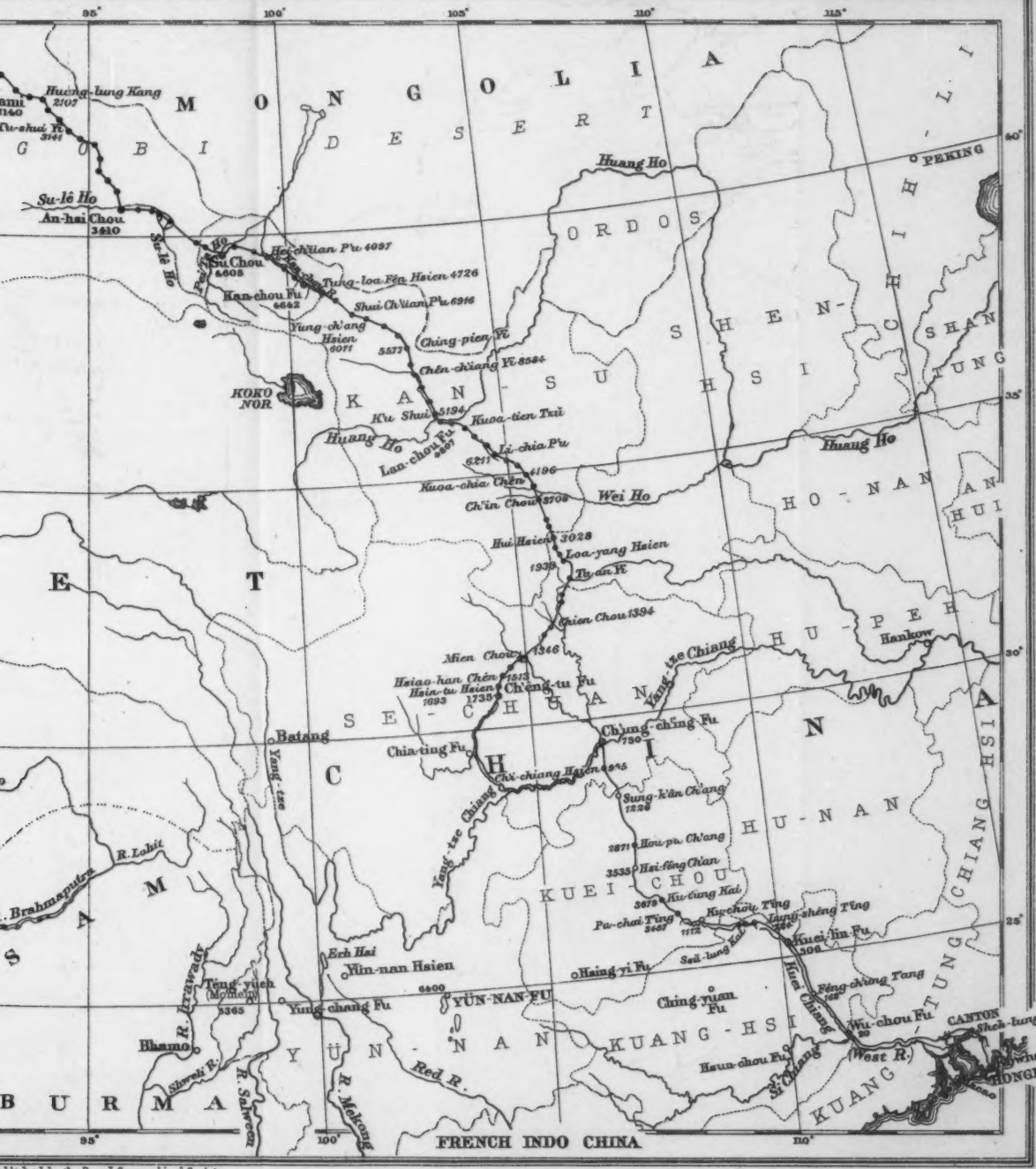

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KASHGAR TO KOWLUN
CLEMENTI

INDEX.

* Denotes Articles and Papers. † Bibliographical Entry.
§ Reviews and Notices.

A.

Abbate, Pasha, Encore le Canal Abbas II., 344 †
Abitibi—
  Au lac Abitibi. Relation de la mission en 1837 par Mr. de Bellefeuille, 230 †
Abor country—
  Abor expedition: A. Hamilton, 342 †
  Abor Jungles, In: A. Hamilton, 662 †
  Further Surveys in Abor Country by Major Gunter, 563
  Surveys of Abor Expedition, 84
Abydos, the Troad, 31
Abyssinia—
  Meteorological Notes, 388
  Photographs: R. Hayne, 588 †
  Sidamo et chez les Gallas Aroussi, Au: H. Latham, 663 †
  South-Western Abyssinia, A Journey in: G. Montandon, 372 *
  Traversée du massif Ethiopien, etc.: G. Montandon, 663 †
Acholi tribe, Central Africa, 433
Adamawa—
  Geschichte Adamauas nach mündlichen Ueberlieferungen: K. Strümpell, 229 †
Adamello-Presanella, Sui ghiacciai dell': L. Marson, 111 †
Adams, F. W., Experimental contribution to question of depth of zone of flow in Earth's crust, 338 §, 461 †
Adams, G. I., & W. E. Pratt, Geologic Reconnaissance of South-Eastern Luzon, 442 §, 455 †
Adamson, R. S., An ecological study of a Cambridgeshire Woodland, 227 †
Admiralty charts, †126, 239, 352, 467, 586, 679
Admiralty Hydrographical Surveys during 1911..317
Adonara—
  Maps: Schetskaart van het Eiland Adonara, 237 †
Adramyttium, the Troad, 32
Adriatic—
  Geologischer Führer durch die Nördliche Adria: R. Schubert, 575 †
  Najade, Dritte Terminfahrt, in der Hochsee der Adria: E. Brückner, 659 †
Adriatic—*continued.*
  Najade in Hochsee der Adria 1911, Vierte Terminfahrt: A. Grund, 439 §, 451 †
  Risultati fisico-Chimici delle prime cinque crociere Adriatiche, 225 †.
Aflalo, F. G., A book of wilderness and jungle, 582 †
Africa—
  Animal life in Africa: J. Stevenson-Hamilton, 207 §
  Aufteilung Afrikas: F. Hänsch, 664 †
  British East—
    Climat du Kikouyou, etc.: J. Soul, 114 †
    Colony in the making: Lord Cranworth, 578 †
    East Africa Protectorate. Report for 1910–11 (Colonial Report), 114 †
    Geography of, Notes on: E. H. Sadler, 114 †
    Handbook of: H. F. Ward and J. W. Milligan, 343 †
    Plateau of B.E. Africa and its inhabitants: G. L. Collie, 456 †
    Survey Department of B.E. Africa. Annual Report: G. S. Knox, 114 †, 456 †
  Central—
    An der Wasserscheide zwischen Kongo und Zambesi: A. Bencke, 344 †
    Ethnographie des Nil-Kongo-Zwischengebiets: J. Czekanowski, 114 †
    Régions voisines de frontière orientale du Congo belge du Tanganyka au lac Albert: J. Maury, 344 †
    Wasserscheide zwischen Kongo und Zambesi: A. Bencke, 344 †
  Chemins de fer en Afrique et le trans-Africain: V. E. Roume, 229 †
  Civiltà africaine: R. Pettazzoni, 664 †
  East—
    Svenska zoologiska expeditionen till Ostafrika, 1910–11: E. Lönnberg, 344 †
  Farm Lands of rich South-West, 665 †
  French Equatorial—
    Au cœur de l'Afrique Equatoriale: M. Martin, 579 †
    Cartographie du Congo français, Contribution à la: A. Le Gallois, 344 †

Africa—*continued.*
French Equatorial—*continued.*
Congo Méconnu: J. Dybowski, 553 §
Étude sur le pays Koudou-Djouah: Debrand, 114 †
Mission hydrographique Congo-Oubangui-Sanga: H. Roussilhe, 344 †
Notes sur pratiques religieuses des Ba-Kalè: R. Avelot, 579 †
Pays du Logone-Chari: E. Mercier, 579 †
French West—
Afrique occidentale française: L. Sonolet, 553 §
Haut-Sénégal-Niger (Soudan Français): M. Delafosse, 114 †
German East—
Hohenbestimmungen in Deutsch-Ostafrika: L. Fromm, 579 †
Küsten- und Seefischerei in Deutsch-Ostafrika: O. Peiper, 664 †
Landschaften Issansu und Iramba: E. Obst, 579 †
Neuen Wegen durch Ruanda und Urundi: H. Meyer, 456 †
Tabora railway, 443
Von Mkalama ins Land der Wakindiga: E. Obst, 115 †
German South-West—
Eisenbahn Karibib-Windhuk-Keetmanshoop, 457 †
Erkundungsritt in das Kaukau-Veld: Hauptmann Müller, 665 †
Geographische Forschungen im politisch interessanten Okawango-Gebiete: F. Seiner, 457 †
Heart of Africa, Through: F. H. Melland and E. H. Cholmeley, 433 §, 664 †
"Inner-Afrika-Expedition," Herzog Adolf Friedrich zu Mecklenburg über seine, 230 †
Languages in Central Africa, Orthography of, 655
Maps: Africa (Director of Surveys, Southern Nigeria), 585 †; Africa (Geog. Section, General Staff), 238 †, 350 †, 585 †; Africa (Survey Office, Khartum), 238 †, 675 †; "African World" map of West Africa: A. Gross, 124 †; Afrique Équatoriale Française, Carte Générale: G. Delingette, 350 †; Bacon's map of Southern Africa, 123 †; Central and South Africa: J. G. Bartholomew, 675 †; East Africa Protectorate, showing Game Reservations and Uganda Railway, etc.: H. F. Ward and J. W. Milligan, 238 †; Mar Rosso e Possedimenti Italiani in Africa: G. De Agostini, 122 †
North—
Colonization Française dans l'Afrique du Nord: V. Piquet, 432 §
"Dry-farming" et ses applications dans l'Afrique du Nord: A. Bernard, 230 †
Africa—*continued.*
North—*continued.*
'Twixt Sand and Sea: C. F. and L. Grant, 206 §
North-East—
Khartoum, De, à Addis-Abeba: J. Parmentier, 457 †
Ricordi della Seconda Spedizione Ruspoli: L. Cufino, 115 †
Portuguese West—
Alguns trechos do relatorio do Rego Lima sobre a sua missao ás minas de Cassinga em 1898..579 †
South—
Coasts of, 296
Geology, South African: E. H. L. Schwarz, 666 †
Historical Geographies: J. R. Fisher, 665 †
Irrigation in South Africa: W. A. Legg, 230 †
Land and sea breezes of South Africa, Note on: J. R. Sutton, 457 †
Life of a South African tribe: H. A. Junod, 579 †
Mines Department Annual Report: H. W. Smyth, 115 †
South Central Africa, In: J. M. Mowbray, 230 †
Terrestrial isomagnetic lines for South Africa for epoch July 1, 1903: J. C. Beattie, 457 †
Transafricain; d'Alger au Cap: A. Berthelot, 229 †
West—
Alone in West Africa: M. Gaunt, 435 §
Chemin de fer franco-allemand du Kamerun à l'Ubangi, Projet de: A.-J. Wauters, 115 †
Forstliche Studienreise nach Französisch-Kongo, etc.: Reder, 458 †
Frontier delimitations, 643
Photographs of West African Natives: G. J. Tomlinson, 128 †
African Islands, West—
Dans l'Atlantique: Saint Hélène, etc.: H. Dehérain, 666 †
Agassiz, L., Observations on glaciers, 285, 293
Agriculture—
Geographical conditions in, 589, 590
Intensive agriculture, Local climatic peculiarities in their relation to: E. R. Miller, 234 †
Practice of agriculture, Some geographic relations illustrated in: R. E. Dodge, 463 †
Air: *see* Meteorology
Akobo river, Abyssinia, 384
Alaska—
Coal deposits, Geography in development of: A. H. Brooks, 458 †
Geologic reconnaissance of Iliamna Region: G. C. Martin and F. J. Katz, 666 †
Geology and mineral resources of

Alaska—*continued.*
Nizina district: F. H. Moffit and S. R. Capps, 458 †
Glaciers and Glaciation of Alaska: R. S. Tarr, 230 †
Gletscheruntersuchungen längs der Küste von Alaska: L. Martin, 666 †
Mountain Climbing in Alaska: D. Keen, 458 †
Mountaineering in Alaska, 217
Sitka mining district: A. Knopf, 458 †
Topographic surveys, Progress of: R. H. Sargent, 666 †
Alberta—
Maps: Cereal Map of Alberta (Dept. of Interior, Ottawa), 238 †; Northern Alberta, showing lands finally disposed of (Dept. of Interior), 124 †
Aleutian islands—
Expedition to: W. Jochelson, 318
Alexander, A., Report on Amundsen's Observations at South Pole, 567
Algeria—
Algerisch-tunesische Atlasgebirge: H. B. Hagen, 664 †
Algiers, Sahara and Nile: R. Humphreys, 665 †
French Africa, In: Miss Betham-Edwards, 664 †
Maps: Sahara Algérien (Service Géog. de l'Armée), 466 †
Mittelmeer zum Sahara-Atlas, Vom: M. Rikli and others, 664 †
Profils en long de cours d'eau en Algérie-Tunisie: E. F. Gautier, 114 †
Almagia, R., La Cirenaica, 458 †
Almeida, P. C. d', La Terre; Géographie Générale, 439 §
Alonso, C. G., Ensayo de analisis y sintesis geográficas, 121 †
Alpine Glaciers, General features of, 280
Alps
Alpine studies: W. A. B. Coolidge, 659 †
Berneroberland und Nachbargebiete: A. Baltzer, 659 †
Building of Alps: S. G. Bonney, 575 †
Dans les Alpes Pennines: W. A. B. Coolidge, 659 †
Entre Isère et Doiire: W. A. B. Coolidge, 659 †
Geological structure of Alps, Report on investigation of: B. Willis, 225 †
Ghiacciai dell' Adamello-Presanella: L. Marson, 111 †
Gruppo dell' Argentera: F. Sacco, 225 †
Historischen Atlas der Österreichischen Alpenländer: R. Sieger, 452 †
Karrenbildungen in den Schweizeralpen: A. Heim und P. Arbenz, 225 †
Lawinen der Alpen, Ueber die: F. Frech, 225 †
Nouvelle route des Alpes: O. Justice, 576 †
Ostalpen, Hebung der atmosphärischen Isothermen in den: H. Mikula, 659 †
Provence, Alpes de: G. Tardieu, 340 †
Savoie, Alpes de: E. Gaillard, 341 †
Alps—*continued.*
Tectonique des montagnes situées entre Mont-Blanc et petit Saint-Bernard: W. Kilian et C. Jacob, 225 †
Writings, List of, dating from 1868 to 1912, relating to Alps or Switzerland: W. A. B. Coolidge, 452 †
Zones isopiques, Sur le non-parallélisme des: W. Kilian et C. Jacob, 225 †
Altai—
Mongolian Altai at sources of Irtish and Kobdo: W. W. Sapozhnikoff, 323 §
Alzonne, C., Impressions antarctiques, 118 †
Amazon—
Amazon jungle, In the: A. Lange, 232 †, 635 §
Amdrup, G., Carlsbergfondet's Expedition til Øst-Grønland, 581 †
America—
Civilizations, Early, of America, A discussion of origin of, etc.: C. R. Enock, 116 †
English People overseas, Vol. 1, American Colonies, 1583–1763: A. W. Tilby, 116 †, 438 §
Migration of people, Influence of presence . . . of precious metals in America on: G. D. Hubbard, 345 †
America, Central—
Maps: Atlas de Centro-America: L. Mendioroz, 676 †
Old Panama and Castilla del Oro: C. L. Anderson, 117 †
America, North—
Afforestation in American Prairies: H. P. Baker, 218
Arctic Coasts of North America, E. de K. Leffingwell's Researches, 565
Atlantic Seaboard and North America: E. W. Heaton, 345 †
Birds of North and Middle America: R. Ridgway, 116 †
Climate, Fluctuating, of North America: E. Huntington, 264 *, 392 *
Côte Atlantique de l'amérique du Nord, Fixité de: D. W. Johnson, 335 §, 667 †
Entdeckung Amerikas durch die Nordmänner und die Sagas vom Vinland: F. Nansen, 116 †
Great American Desert, Glimpses of: R. J. Pool, 459 †
Maps: Geologic map of North America (U.S. Geological Survey), 677 †; Meteorological Charts of Great Lakes (U.S. Weather Bureau), †126, 240, 352, 587, 680
Pleistocene Glaciation of North America, etc.: W. H. Hobbs, 116 †
Prärien in Zentralnordamerika und ihr Wert für Postkultur: H. P. Baker, 116 †, 218 §
America, South—
Archæology, South American: T. A. Joyce, 232 †, 435 §

America, South—*continued.*
Coasts of, 296
Fossilen pferde Südamerikas: I. Sefve, 669 †
Maps: Commercial map of South America: J. G. Bartholomew, 677 †
Pflanzenformationen Süd-Amerikas, Uebersicht über: C. Skottsberg, 459 †
Woman's Winter in South America: C. Cameron, 209 §
American—
Colonies, 1583–1763: A. W. Tilby, 116 †, 438 §
Museum of Natural History, Polar Celebration at, 91
Americanists, Eighteenth International Congress of, 318
Ami, H., Federal Bureau of Geography for Canada, 620
Amsterdam—
Oud-Amsterdam: F. Muller & Co., 452 †
Amu-daria, On changes in delta of: K. N. Vladimirof, 113 †
Amundsen, R.,, Observations at South Pole, Report on, by A. Alexander, 567
Anderson, C. L., Old Panama and Castilla del Oro, 117 †
Anderson, T., remarks on "Some New Zealand Volcanoes," 24
Andes—
Fenomeni di cattura nelle regione delle Ande: G. Azzi, 668 †
Andorra, the hidden republic: L. G. Leary, 660 †
Andrade, A. de, Journey to Tibet, 1624: C. Wessels, 332
Andree, K., Probleme der Ozeanographie in ihrer Bedeutung für die Geologie, 462 †
Andrees allgemeiner Handatlas, 125 †
Andrews, E. C., Erosion and its significance, 347 †
Anfossi, G., Pioggia nell' alta valle del Gorzente, 226 †
Angola—
Expedition into Southern Interior of Angola by Comte J. de Rohan-Chabot, 564
Annam—
Maps: Carte des Deltas de l'Annam (Service Géo. de l'Indo-Chine), 584 †
Anson, Admiral Lord, Life of: W. V. Anson, 82 §
Anson, W. V., Life of Admiral Lord Anson, 82 §
Antarctic—
American discoverers of Antarctic Continent: A. W. Greely, 460 †
Continent, The Antarctic: W. S. Bruce, 546 *
Daily Chronicle and South Pole, 460 †
Discovery, Log Book of, 1904: A. B. Armitage, 581 †
Expeditions—
Amundsen's, 6
Australian: D. Mawson's progress, 6, 91, 447, 567
Antarctic—*continued.*
Expeditions—*continued.*
British: R. F. Scott's progress, 6, 447; Expedition Scott vers le Pôle sud: C. Rabot, 346 †
German: Deutsche Antarktishe Expedition, 346 †
Japanese, 220
Recent Antarctic Expeditions, letter from R. N. R. Brown and J. H. H. Pirie on, 223
Scottish National Expedition. Report on Scientific Results: W. S. Bruce, 232 †
Impressions antarctiques: C. Alzonne, 118 †
Mousses de l'Expédition nationale antarctique écossaise: J. Cardot, 460 †
Observations at South Pole by Captain Amundsen, Report by A. Alexander, 567
Present Position of Antarctic Discovery: Sir C. R. Markham, 541
Priapulids and Sipunculids dredged by Swedish Antarctic Expedition, 1901–1903: H. Théel, 346 †
Race for South Pole: F. Nansen, 461 †
Recent Antarctic Discoveries: E. S. Balch, 460 †
Anthropogeography—
Anthropogeographie: F. Ratzel, 120 †
Studi di anthropogeografia generale: R. Biasutti, 120 †
Waldes, Zur Anthropogeographie des: R. Marek, 672 †
Anuak country, Egyptian Sudan, 442
Anvers—
Maps: Plan de la Ville d'Anvers: A. De Boeck, 349 †
Apalachicola, Lower, River-bank vegetation of: R. M. Harper, 116 †
Apennines—
Climatologia dell' Appennino Ligure, Contributo alla: G. Anfossi, 226 †
Apstein, K., Verbreitung der pelagischen Fischeier und Larven in der Beltsee und den angrenzenden Meeresteilen 1908–09..119 †
Arabia—
Expédition de Société royale danoise de Géographie en Arabie: B. Raunkiær, 331 §, 661 †
Explorations by Prof. Musil, 643
Peoples of Arabia and Syria, Influence of environment on: G. M. Marten, 661 †
Photographs of Salif, Yemen: H. E. Poynter, 352 †
Aragon—
Peña Montañesa, Sous la: L. Briet, 453 †
Arbenz, P.: *see* Heim, A.
Archæology—
Byways in British Archæology: W. Johnson, 71 §
Arctic—
Arctic Prairies: E. T. Seton, 345 †
Crocker Land Expedition: R. E. Peary

Arctic—*continued.*
and others, 581 †; Reorganization of, 90
Expeditions: Rasmussen's, 220
Exploration of Arctic Regions, New projects for, 220
Glaces de mer de Kara et de mer de Sibérie: A. Kolchak, 581 †
Hunters and Hunting in Arctic: Duke of Orleans, 79 §
North American Arctic Coasts, Researches by E. de K. Leffingwell, 565
North-East Passage, Russian voyage by, 646
Technique of Arctic winter travel: V. Stefansson, 581 †
Arctowski, H., Studies on Climate and Crops, 668 †
Ardennes—
Population agricole au XIX^e^ siècle: E. Vliebergh et R. Ulens, 340 †
Arey, A. L., and others, Physiography for High Schools, 582 †
Argentera, Gruppo dell': F. Sacco, 225 †
Argentina—
Ibera Lagoon, Exploration of: P. Uhart, 335
Railways of, 607
Twentieth Century Impressions of Argentina: R. Lloyd and others, 76 §
Arizona—
Ancient village sites, 266
Explosion von Meteoren und der Meteorkrater von Canyon Diablo in Arizona: M. E. Mulder, 345 †
Kratern, Om, vid Canyon Diablo: H. Sjögren, 116 †
Photographs: I. N. Dracopoli, 127 †
Population, Pre-Columbian, 516
Arldt, T., Biogeographische Nomenklatur, 670 †
Armenia—
Armenien: F. Oswald, 661 †
Armitage, A. B., Log Book of *Discovery*, 581 †
Arno—
Valle dell' Arno, Dalla toponomastica della: S. Pieri, 452 †
Arroyo Valcheta, Patagonia, 612
Artbauer, O. C., Berber in den Bergen des Rif, 457 †
Asama-Yama—
Eruptions and Earthquakes of: F. Omori, 85 §, 343 †
Ascoli, F. D., Rivers of the Delta, 343 †
Asia—
Alte Verkehrsbeziehungen zwischen China und Vorderasien: A. Herrmann, 228 †
Arctic Coasts of, G. Brussilov's voyage, 646
Hinterindische Eisenbahnfragen: C. C. Hosseus, 456 †
Japanese Northern Explorations during Tenmei and Bunka periods: T. Ogawa, 455 †
Journey from Kashgar to Hongkong,

Asia—*continued.*
Positions determined by C. Clementi on, 624
Railway, Proposed, from Mediterranean to India: C. E. D. Black, 114 †
Royaumes des Neiges: C.-E. Bonin, 74 §
Temperature, Distribution of, 523
Asia Minor—
Ibora-Gazioura? Etude de géographie pontique: G. de Jerphanion, 112 †
Lage von Kaisareia in Bithynien, Ueber die: J. Sölch, 228 †
Maps: Karte von Kleinasien: R. Kiepert, 585 †, 675; Topographische Karte des Westlichen Kleinasien: A. Philippson, 465 †
Modrene, Modroi und Gallus: J. Sölch, 228 †
Troad, Notes on the: W. Leaf, 25 *
Aspinall, A. E., British West Indies, 328 §
Asquith, Right Hon. H. H., remarks at R.G.S. Anniversary Dinner, 105
Assyria—
Ancient Assyria: C. H. W. Johns, 112 †, 439 §
Athens—
Meteorologie von Athen: J. F. J. Schmidt und K. Knoch, 341 †
Atlantic—
Cable, Atlantic, position and its moral: C. Bright, 120 †
Coast, Atlantic and Pacific Types of: E. H. L. Schwarz, 294 *
Deposits of Atlantic, 414
Earth-movements round Northern Atlantic: G. de Geer, 647
Islands, Legendary, of North Atlantic: T. J. Westropp, 648
Maps: Meteorological Charts of N. and S. Atlantic (U.S. Weather Bureau), † 126, 239, 352, 587, 679; N. Atlantic and Mediterranean (Met. Office, London) †, 126, 239, 468, 587, 679
Oberflächentemperatur des nordwestafrikanischen Auftriebgebietes, 119 †
Pilot Charts of N. and S. Atlantic (U.S. Hydrog. Office), † 126, 239, 468, 587, 679
Sub-oceanic physiography of North Atlantic Ocean, Monograph on: E. Hull, 348 †
Vulkanologische Studien auf einigen Inseln des Atlantischen Oceans: M. v. Komorowicz, 348 †
Atlantis—
Atlantide, Sur l': L. Germain, 232 †
Atlas mountains—
Tectonique du Haut Atlas marocain, etc.: L. Gentil, 457 †
Atlases—
Ancient History, School Atlas of: W. & A. K. Johnston, 351 †
Andrees allgemeiner Handatlas, 125 †
Calendario-Atlante De Agostini, 1912.. 125 †
Cambridge Modern History Atlas:

Atlases—*continued.*
A. W. Ward, G. W. Prothero, and S. Leathes, 238 †
Deutschen Kolonien, Wirtschafts-Atlas der: M. Eckert, 351 †
Formæ Orbis Antiqui: R. Kiepert, 586†
Neuer Handatlas über alle Teile der Erde: E. Debes, † 125, 238, 351, 467, 586, 678
Nouvel Atlas de Marine, Der erste preussische Seeatlas 1749: I. Brouckner and M. Groll, 678 †
School Economic Atlas: J. G. Bartholomew and L. W. Lyde, 677 †
Wall Atlases, Philips' comparative series of: J. F. Unstead and E. G. R. Taylor, 678 †
Wall Atlases of the Continents, Philips' comparative series of: J. F. Unstead and E. G. R. Taylor, 336 †
Atmosphere: *see* Climatology
Atmospheric electricity—
Leitfähigkeit der Atmosphäre über dem Grossen Ozean, Verteilung der: A. Nippoldt, 221 §, 581 †
Observations on second cruise of *Carnegie* from New York to Columbo: E. Kidson, 233 †
Atrato, Por el: J. Vallejo, 232 †
Atwood, W. W., Geographic study of Mesa Verde, 667 †
Aurora, work in sub-Antarctic waters, 447, 448, 567
Australia—
Across Australia: B. Spencer and F. J. Gillen, 328 §, 460 †
British State in the making: Sir N. J. Moore, 118 †
Capital of Australia, Design for, 445
Coalfields and Collieries: F. D. Power, 581 †, 639 §
Continental Margin of Eastern Australia: C. Hedley, 90
Desert Water-holes in Western Australia: M. Maclaren, 219, 669 †
Explosive or booming noises (Barisàl Guns) in Central Australia, On occurrence of: J. B. Cleland, 346 †
Geographical and politico-economical problems of Commonwealth of Australia: J. V. Daneš, 117 †
Glaciations, Australian: W. Howchin, 460 †
Maps: Average rainfall and isohyets of Western Australia: H. A. Hunt, 586 †; Rainfall for 1911: H. A. Hunt, 125 †; W. Australia showing statistical Areas, 467 †
Northern Territory, Study of certain native tribes of: B. Spencer, 669 †
Railway, Australia's Trans-Continental: H. K. Ellison, 460 †
Settlement of "Whites" of tropical Australia: Hon. J. M. Creed, 669 †
South: Description of disturbed area of Cainozoic rocks: W. Howchin, 460 †; Note descriptive of stereogram of Mount Lofty Ranges: W. N. Benson, 460 †
Austria—
Census returns, 65
Geologischer Führer für Exkursionen im inneralpinen Becken der nächsten Umgebung von Wien: F. X. Schaffer, 660 †
Maps: Schulhandkarte der Bezirkshauptmannschaft Liezen: L. Comai und A. Bischofberger, 464 †: Schulhandkarte des Herzogtums Schlesien: R. Kober, 464 †; Touristen-Wanderkarten: G. Freytag, 464 †
Taltreppe: V. Hilber, 225 †
Verschiebung der Meeresgrenze in Kroatien und Dalmatien in historischer Zeit: A. Gavazzi, 659 †
Austria-Hungary—
Österreich-Ungarn und die Vereinigten Staaten, ein Vergleich: M. Binn, 121 †
Avelot, R., Notes sur pratiques religieuses des Ba-Kalè, 579 †
Aveyron—
Segalas du Rouergue: M. Brienne, 340 †
Aviation maps—
Clift-Gross Aviation Maps. Brooklands-Salisbury Plain, 122 †
Aymard, A., Le long du Chemin de fer du Yunnan, 113 †
Azzi, G., Direzione dei corsi d'acqua e lo sviluppo della superficie topografica, 348 †; I fenomeni della erosione nelle argille azzurre del pliocene nel bacino del Santerno, 226 †; I fenomeni di cattura nella regione delle Ande, 668 †; Significato delle geoforme elementari in geomorfogenesi, 670 †

B.

Babylon—
Genevois à Babylone en 1873: A. Pictet and G. Fatio, 456 †
Bachmann, C., Geographische Verbreitung des Reisbaues, etc., 234 †
Backlund, H., Résultats scientifiques de l'Expédition des frères Kuznetzov à l'Oural Arctique en 1909..576 †
Bacon & Co., G. W., Excelsior Railway Map of Ireland, 464 †; Excelsior Map of Mediterranean Lands, 675 †; Gage's New Excelsior Map of Dominion of Canada, 676 †; Library and Commercial Route Chart of World on Mercator's Projection, 677; Maps of London, 464 †; Map of Southern Africa, 123 †
Bacot, J., Tibet Revolté, 342 †, 551 §
Baden—
Maps: Geologische Spezialkarte des Grosshezogtums Baden, 465 †
Badigeru swamp, khors of, 495
Baedeker, K., Handbooks for travellers: London and its environs, 342 †; Norway, Sweden, and Denmark, 111 †;

Palestine and Syria, 113 †, 325 §; Southern Italy and Sicily, 342 †
Bailey, E. B., New Mountain of year 1910, Usu-san, Japan, 662 †
Bailey, F. M., letter from, on "South-Eastern Tibet and Mishmi Hills," 657; R.G.S. award to, 98
Baker, C. L., Notes on Later Cenozoic History of Mohave Desert Region, 116 †
Baker, G., A Winter Holiday in Portugal, 321 §
Baker, H. P., Prärien in Zentralnordamerika und ihr Wert für Forstkultur, 116 †, 218 §
Bako river, Abyssinia, 379, 380
Balch, E. S., Recent Antarctic discoveries, 460 †
Balfour, H., remarks on "Early Bronze Age Settlements in Britain," 199
Balkan peninsula—
Maps: Balkanländer: C. Fleming, 673 †; *Daily Chronicle* War Map of Balkans: A. Gross, 673 †; *Daily Mail* War Map of Balkans: G. Philip & Sons, 673 †; Generalkarte der Südost Europäischen Halbinsel: H. Kiepert, 673 †; Karte von Makedonien, Altserbien und Albanien: K. Peucker, 464 †; Uebersichtskarte der nördlichen Balkanländer, 673 †
Ball, J., Meteorite of El Nakhla el Baharia, 344 †
Ballivian, M. V., and C. F. Pinilla, Industria de la goma elastica en Bolivia, 231 †
Baltic—
Eisverhältnisse im Finnischen Meerbusen und im Nordlichen Teile der Ostee: H. Karsten, 119 †
Storstäderna vid Ostersjön: S. De Geer, 340 †
Verbreitung der pelagischen Fischeier und Larven in der Beltsee und angrenzenden Meeresteilen 1908–09: K. Apstein, 119 †
Baltzer, A., Berneroberland und Nachbargebiete, 659 †
Banks, Sir J., Life of: E. Smith, 348 †
Bannerman, D. A., Photographs of Gran Canaria, Canary Islands, 587 †
Banse, E., Geographie, 121 †; Isochronenkarte des Orients, 463 †; Tripolis, 553 §; Wüsten, Steppen, Wälder und Oasen des Orients, 121 †
Barbarich, E., Tuscia Romana, 453 †
Bardon, H., Deuxième voyage in Maroc, 665 †
Barikot, Kohistan, 50
Barkow, E., Ueber eine Methode zur Messung von Hochseegezeiten, 120 †
Barnes, H. T., Icebergs and their location in navigation, 339 §, 462 †
Barrion, G., Canal du Djerid, 458 †
Bartholomew, J. G., Commercial Map of S. America, 677 †; Map of Central and South Africa, 675 †; Orographical reduced survey map of United States and part of Canada, 586 †; Survey Atlas of Scotland, 122 †; and L. W. Lyde, School Economic Atlas, 677 †
Bartholomew & Co., J., New reduced survey map of Scotland, 584 †
Bastos, A., Monographia de Catumbella, 456 †
Batavia—
Windverhältnisse in den oberen Luftschichten nach Ballonvisierungen in Batavia: W. van Bemmelen, 229 †
Bavaria—
Bayrischen Hochseen: J. Reindl, 341 †
Bayarunass, M. V., Report on geological investigations in steppes of Mangyshlak district, 113 †
Bazdarra, Valley of, Ruins of ancient fortified dwellings in, 330
Beach-cusps: D. W. Johnson, 233 †
Bean, Ground, A new: O. Stapf, 463 †
Beattie, J. C., Terrestrial isomagnetic lines for South Africa for epoch July 1, 1903..457 †
Beauclerk, O., letter from, on Prof. Parker's Ascent of Mount McKinley, 656
Beazley, C. R., Prince Henry of Portugal and his . . . work, 463 †, 569 §
Bedford, Duchess of, Photographs of Jan Mayen, 127 †
Beekman, A. A., Geschiedkundige Atlas van Nederland, 584 †
Beir Country: H. H. Kelly, 497 *
Belgium—
Évolution du Système fluvial de la Moyenne et de la Basse-Belgique: C. Van de Wiele, 452 †
Handbook (Ward, Lock & Co.), 111 †
Bell, H. G, obituary, 653
Bell, Sir H., remarks on "Northern Nigeria," 166
Bell, J. M., Some New Zealand Volcanoes, 8 *; and others, Geology of Dun mountain subdivision, Nelson, 581 †
Bell, L. L., Exploring in Papua, 346 †
Bellefeuille, — de, Relation de la mission en 1837 chez les sauvages du lac Abbitibbi, 230 †
Bemmelen, W. van, Lunare Variation des Erdmagnetismus, 671 †
Bencke, A., An der Wasserscheide zwischen Kongo und Zambesi, 344 †; Nordwestliche Grenzproving Indiens, 662 †
Benson, W. N., Note descriptive of stereogram of Mount Lofty Ranges, South Australia, 460 †
Benton, P. A., Notes on some languages of Western Sudan, 115 †, 633 §
Benue—
Voie de la Bénoué: E. Mercier, 230 †
Beresteyn, M. H. van, Getijconstanten voor plaatten langs de kusten en benedenrivieren in Nederland, etc., 452 †
Berlin—
Population, 63
Bernard, A., "Le dry farming" et ses applications dans l'Afrique du Nord, 230 †

Bernet, E., En Tripolitaine, 344 †
Berry, A. J., Association of history and geography, 211 §
Berry, R. G., Sierra Leone Cannibal, 665 †
Berthelot, A., Un Transafricain: d'Alger au Cap, 229 †
Bertolini, G. L., Su la Cosmografia di Cosma Indicopleuste, 463 †
Betham-Edwards, Miss, In French Africa, 664 †
Bevis, J. F., and H. J. Jeffery, British Plants—their Biology and Ecology, 204 §
Bews, J. W., Vegetation of Natal, 665 †
Biasutti, R., Studi di anthropogeografia generale, 120 †
Bibliography—
Illustrations from one hundred manuscripts in Library of H. Y. Thompson, 673 †
Bierzo—
Excursión en el Bierzo: G. Rey, 577 †
Bilaphon pass, Himalaya, 616
Bingham, H., Ascent of Coropuna, 459 †: Vitcos, the Last Inca Capital, 636 §
Binn, M., Osterreich-Ungarn und die Vereinigten Staaten, ein Vergleich, 121 †
Binsteed, G. C., Photographs of Siberia and Mongolia, 128 †
Biogeography—
Biogeographische Nomenklatur: T. Arldt, 670 †
Birrell, J. H., Business geography, 582 †
Bischofberger, A.: *see* Comai, L.
Bishop, A. L., Development of wheat production in Canada, 231 †
Bismarck Archipelago—
Forschungsreise im Bismarck-Archipel, 76 §
Bjørnbo, A. A., Cartographia Groenlandica, 670 †
Bizerta—
Observations faites pour détermination par télégraphie sans fil de la difference de longitude entre Paris et Bizerte: M. Bourgeois, 230 †
Black, C. E. D., Proposed railway from Mediterranean to India, 114 †
Black Combe District, Cumberland, Glaciation in: B. Smith, 641
Black Forest—
Vegetationsbilder aus dem Schwarzwald: K. Muller, 226 †
Black Mountain to Waziristan, From: H. C. Wylly, 632 §
Black sea—
Canal scheme between Black Sea and Baltic, 642
Blackburn, Mount, Alaska, First expedition to: D. Keen, 217 §, 666 †
Blackham, R. J.: *see* Lukis, C. P.
Blanc, Mont—
Paccard's lost narrative: H. F. Montagnier, 225 †
Blancard, P., Voyages de, 235 †
Blázquez, A., El periplo de Himilco, 121 †; Tres estudios geográficos de España en el siglo XVI... 111 †
Blösch, E., Grosse Eiszeit in Nordschweiz, 577 †
Blume, E., Germanischen Stämme u. d. Kulturen zwischen Oder und Passarge zur römischen Kaiserzeit, 226 †
Boeck, A. de, Plan de la Ville d'Anvers, 349 †
Boerschmann, E., Baukunst und Landschaft in China, 662 †
Bohemia—
Blitzschlag verursachten Felsabsturz im Mittelgebirge: D. Häberle, 659 †
Historische Geographie Böhmens: W. Friedrich, 225 †
Seebecken im Gebiete des oberen Polenztales in Nordböhmen, Entstehung der: B. Muller, 225 †
Talgeschichte der Stillen Adler in Ostböhmen: A. Meissner, 659 †
Böhm, A., Ueber Berechnungsformeln des Erdsphäroides u. d. Besselschen Konstanten, 347 †
Boigey, —, Massif montagneux des Beni Snassen et ses abords, 457 †
Bois, D.: *see* Capus, G.
Bolivia—
Altiplanicie paceña: R. Paredes, 231 †
Boundary between Peru and Bolivia, 89
Industria de la goma elastica en Bolivia: M. V. Ballivian y C. F. Pinilla, 231 †
Limites, Informe de la Comision de: P. H. Fawcett, 231 †
Monumentos prehistóricos de Tihuanacu é Islas del Sol y la Luna, Guiá general ilustrada: A. Posnansky, 459 †
Obras Publicas, Informe del Director General de: A. Capriles, 445 §, 459 †
Railways, Progress of, 445
Tiahuanacu ruins, Excavations at, 645
Bonin, C.-E., Royaumes des Neiges, 74 §
Bonney, S. G., Building of Alps, 575 †
Bonney, T. G., Work of rain and rivers, 640 §, 670 †
Borel, H., New China, 205 §
Borghei, Khor, Sudan, 487
Borneo—
Bah Country of Central Borneo, An expedition to: R. S. Douglas, 455 †
Boundary Delimitation, by P. van Graderen Stort, 643
Landschappen Sambas en Potianak der Wester-afdeeling van Borneo: T. J. H. van Driessche, 455 †
Bornholm—
Landeskunde von Bornholm, Grundzüge einer: K. A. Reeps, 452 †
Borzi, A., Tripoli e Cirenaica, 458 †
Bosworth, T. O., Birth of an island near coast of Trinidad, 459 †
Bourgeois, M., Resultats des observations faites pour détermination par Télégraphie sans fil, de la difference de longitude entre Paris et Bizerte, 230 †

Bouwmeester, W. L., De Ontwikkeling van Nederlands Landschappen, 71 §
Bowie, W. (*see also* Hayford, J. F.), Some relations between gravity anomalies and geologic formations in United States, 218 §, 345 †
Bowman, I., Forest Physiography, 208 §
Bradley, R. N., Malta and Mediterranean race, 660 †
Branner, J. C., Earthquakes in Brazil, 580†
Braun, G., Ueber Bodenbewegungen in Mittel- und Südeuropa, 340 †
Brazil—
Earthquakes in Brazil: J. C. Branner, 580 †
Flora der Umgebung der Stadt São Paulo in Brasilien: A. Usteri, 326 §
Maps: Mappa da Viação Ferrea do Brazil: E. Schnoor, 676 †
Moderne Brasilien in seiner neuesten wirtschaftlichen Entwicklung: E. Dettmann, 668 †
Tribes of Brazil, 319
Brehm, V., Einfluss glazialer und postglazialer Verhältnisse auf die niedere Tierwelt Mitteleuropas, 340 †
Breitfuss, L. L., Wissenschaftlich-praktische Murman-Expedition, 227 †
Brenner Pass: C. L. Clare, 576 †
Brentnall, H. C., and C. C. Carter, Marlborough Country, 112 †, 557 §
Bridgman, P. W., Water, in liquid and five solid forms, under pressure, 462 †
Brienne, M., Segalas du Rouergue, 340 †
Briet, L., Sous la Peña Montañesa, 453 †
Briggs, H., Effects of errors in surveying, 118 †
Bright, C., Atlantic Cable position and its Moral, 120 †
Britain: *see* United Kingdom
Britain in the tropics, 1527–1910: A. W. Tilby, 438 §
British Association—
Antarctic Discovery at, 541
Geography at: E. A. Reeves, 537 *
British Columbia—
Economic prospects of New British Columbia: F. A. Talbot, 458 †
Maps: Northern Interior of British Columbia (Provincial Bureau of Information), 467 †; Province of British Columbia (Dept. of Lands), 467 †
British Empire—
Geography Notes: British Empire: J. C, Chute, 349 †, 558 §
British Isles: *see* United Kingdom
Brodie, W. S., Some effects of ice action near Grand Lake, Cape Breton, 580 †
Bronze Age Settlements in Britain, Distribution of: O. G. S. Crawford, 184 *, 304 *
Brooks, A. H., Geography in development of Alaska coal deposits, 458 †
Brouckner, I., Der erste preussische Seeatlas 1749 "Nouvel atlas de Marine" herausgegeben: M. Groll, 678 †
Brown, A. P., Formation of ripple-marks, etc., 671 †
Brown, A. W., Photographs of River Tarn and Montserrat, 127 †
Brown, J. C. (*see also* Rose, A.), Report on certain gold-bearing deposits of Mong Long, Burma, 662 †
Brown, R. H., Land of Goshen, 435 §
Brown, R. N. R., remarks on Antarctic, Discovery at British Association, 548; and J. H. H. Pirie, letter on Recent Antarctic Expeditions, 223; and others, Use of practical exercises in teaching of geography, 463 †
Bruce, Mrs. A. L., obituary, 93
Bruce, W. S., Antarctic Continent, 546 *; Scottish National Antarctic Expedition, Report on Scientific Results, 232 †
Brückner, E., Dritte Terminfahrt S.M.S. *Najade* in der Hochsee der Adria, 1911..659 †; and others, Dalmatien und österreichische Küstenland, 550 §
Brunnthaler, J., Viktoriafälle des Sambesi und ihre Umgebung, 457 †
Brussilov, G., Voyage by North-East Passage, 646
Bryant, F. L.: *see* Arey, A. L.
Bryant, H. G., Expedition into interior of Labrador, 565
Buchanan, J. Y., In and around Morteratsch Glacier, 454 †; Observations on glaciers, 290, 293
Buchlien, O., Excavations at Tiahuanacu, 645
Buckingham—
Clay-with-flints of Buckinghamshire, On glacial origin of: R. L. Sherlock and A. H. Noble, 577 †
Buen, R. de, Étude sur chute des sédiments dans l'eau, 671 †
Bulgaria—
Maps: Generalkarte des Königreiches Bulgarien: K. Peucker, 674 †
Burchard, D., Durchschnittliche Passatrichtung auf den westlichen Kanaren, 114 †
Burma—
Colonie modèle: Birmanie sous la régime britannique: J. Dautremer, 342 †, 633 §
Geology of Henzada District: M. Stuart, 342 †
Gold-bearing deposits of Mong Long, Report on: J. C. Brown, 662 †
Lisu Tribes of Burma-China Frontier: A. Rose and J. C. Brown, 342 †
Maps: Rangoon River: A. S. Hunton and V. G. Smith, 239 †
Burrard, S. G., Levelling of Precision in India, 322 §: On origin of Himalaya mountains, 662 †
Bushmen—
Kunst der Buschmänner, Ueber die: R. Pöch, 457 †
Buzani ruins, Mexico, 395

C.

Cables—
Atlantic Cable, Position and its Moral: C. Bright, 120 †
Cabot, W. B., In Northern Labrador, 580 †
Cadell, H. M., River development in Central Scotland, 539; Story of the Forth, 454 †
Caillot, A. C. E., Histoire de la Polynésie Orientale, 78 §
Calabria—
Geomorfologia della Calabria, Ancora due parole sulla: M. Gignoux, 452 †
Caldarera, G., Sulla classificazione delle proiezioni geografiche, 461 †
California—
Big trees of, 403, 408
Explorations in Lower California: E. Wittich, 89
Mohave Desert Region in South-East California; Notes on later Cenozoic History of: C. L. Baker, 116 †
Picture post-cards of Californian Missions: G. Newman Co., 240 †
Pseudostratification in Santa Barbara county: G. D. Louderback, 667 †
Calvert, A. F., Plan of Bauchi . . . Tin Fields, Northern Nigeria, 585 †
Cambridge Modern History Atlas: A. W. Ward, G. W. Prothero, and S. Leathes, 238 †
Cambridgeshire—
Ecological study of a Cambridgeshire Woodland: R. S. Adamson, 227 †
Cameron, C., Woman's Winter in South America, 209 §
Canada—
Arctic Prairies: E. T. Seton, 345 †
Census, Fifth, Special Report on Area and Population, 231 †
Census Returns, 67
Clay and shale deposits of Western Provinces: H. Ries and J. Keele, 666 †
Coal resources: D. B. Dowling, 666 †
Geography, Federal Bureau of, 620
Indian Place-nomenclature of Maritime Provinces, Organization of Scientific Investigation of: W. F. Ganong, 580 †
Maps: Gage's New Excelsior Map of Dominion of Canada: G. W. Bacon & Co., 676 †; Orographical reduced survey map of United States and part of Canada: J. G. Bartholomew, 586 †; Sectional Map of Canada (Surveyor-General, Ottawa), 124 †, 467 †, 585 †, 676 †
Natural resources, navigation, etc. (Dept. of Marine and Fisheries), 666 †
Noms Géographiques Sauvages: E. Rouillard, 231 †
North-West Territories, Reports on part of, Geological Survey Branch: W. McInnes and A. W. G. Wilson, 580 †
Northern Canada, V. Stefansson's Explorations in, 443
Canada—*continued*.
Photographs of Rocky Mountains: A. L. Mumm, 127 †
Place Names: J. White, 637 §
Provinces of Canada, Extension of, 87
Tide in deep inlets and ordinary estuaries, Progress of: W. B. Dawson, 580 †
Topographical Surveys Branch, Annual report, 666 †
Wheat production in Canada, Development of: A. L. Bishop, 231 †
Canary Islands—
Durchschnittliche Passatrichtung auf den westlichen Kanaren: O. Burchard, 114 †
Gomera; die Waldinsel der Kanaren: W. May, 343 †
Photographs of Gran Canaria: D. A. Bannerman, 587 †
Canterbury: G. R. S. Taylor, 329 §
Canterbury, Archbishop of, remarks at R.G.S. Anniversary Dinner, 106
Cape Breton—
Ice action near Grand Lake, Some effects: W. S. Brodie, 580 †
Cape Colony—
Cape Colony: S. Playne, 76 §
Cape Colony to-day. Government Railway Dept., 579 †
Cape of Good Hope—
Cape of adventure: I. D. Colvin, 114 †, 207 §
Maps: Geological Map of Province of Cape of Good Hope, 123 †
Mines, Dept. of, Annual Report of Geological Commission, 344 †
Cape Verde Islands—
History, geography, etc.: G. Eveleigh, 344 †
Capps, S. R.: *see* Moffit, F. H.
Capriles, A., Informe del Director General de Obras Publicas, 445 §, 459 †
Capus, G., and D. Bois, Produits Coloniaux, 82 §
Cardot, J., Mousses de l'expédition nationale écossaise, 460 †
Caribbean sea, Coasts of, 295
Carne, J. E., Tungsten-mining industry in New South Wales, 460 †
Carnegie, Atmospheric electricity observations on second cruise of the: E. Kidson, 233 †
Carpathians—
Analogies between Central Massif of France and Eastern Carpathians: L. Sawicki, 83
In the Carpathians: L. Phillimore, 72 §
Carruthers, D., remarks on receiving R.G.S. Gold Medal, 97
Carter, C. C.: *see* Brentnall, H. C.
Carthage—
Ancient Carthage, Settlements in, 206
Cartography (*see also* Maps)—
Bibliothèque Nationale. Notice des documents exposés à la section des cartes: L. Vallée, 449 §, 461 †

Cartography (*see also* Maps)—*continued.*
Classificazione delle proiezioni geografiche: G. Caldarera, 461 †
Genoese world map, 1457: E. L. Stevenson, 349 †
Geschichte der Kartographie: W. Wolkenhauer, 672 †
Map Drawing, Practical Exercises in: D. W. Johnson, 236 †; A. R. Hinks, 670 †
Map Projections in actual use: A. R. Hinks, 232 †, 670 †
Onze kennis van de xvi^d eeuwsche cartographie: F. C. Wieder, 234 †
Service Géographique de l'Armée. Rapport sur travaux exécutés en 1910..347 †
Télégraphie sans fil dans cartographie coloniale, Rôle de la: M. Dehalu, 232 †
Cartwright, G., and his Labrador Journal: C. W. Townsend, 76 §
Casella, C. F., Numerical tables, 461 †
Catalogue—
Periodical publications . . . in Library of University College, London: L. Newcombe, 583 †
Catalonia—
Exploration et flore souterraine des cavernes de Catalogue et des îles Baléares: J. Maheu, 576 †
Catumbella—
Monographia de Catumbella: A. Bastos, 456 †
Caucasus—
Anthropologische . . . Uebersicht über die Völker des Kaukasus: A. Dirr, 456 †
Aus dem zentralen Caucasus: W. Fischer and others, 113 †
Flora of Caucasus, Distribution of, and Highlands of Dagestan . . .: N. I. Kuznetsof, 113 †
Mountains of Caucasus, Guide to: V. A. Merkulof, 73 §, 455 †
Railway developments, 332
Cayeux, L., Exploration archéologique de Délos, 226 †
Celts, Bronze and copper, found in Britain, sites of discovery, etc., 307
Census—
Some Recent Census Returns: O. J. R. Howarth, 60 *
Cépède, C., Gulf Stream dans les mers de l'Europe occidental, 119 †
Cereus giganteus, giant cactus, 515
Ceylon—
Administration Reports, 1909: P. D. Warren. Ditto 1910–11: R. S. Templeton, 577 †
Pearl fisheries of Ceylon: H. M. Smith, 228 †
Tropenwelt, Einführung in die: K. Guenther, 112 †
Chaco canyon, New Mexico, 395, 396
Chad, Lake—
De Bordeaux au Tchad par Brazzaville: Captain Deschamps, 634 §
Chad, Lake—*continued.*
Explorations in Lake Chad Region: Captain Tilho, 645
Chamberlain, J. F. and A. H., Europe, a supplementary Geography, 225 †, 558 §
Chamberlain, W. P., Observations on influence of Philippine climate on white men, 85 §, 455 †
Charco Yuma, Arizona, 271
Charcot, J., Explorations in Jan Mayen, 337
Charts—
Alte und neue Seekarten: M. Groll, 670 †
Charts, New—
Admiralty, † 126, 239, 352, 467, 586, 679
Burma: A. S. Hunton and V. G. Smith, 239 †
Meteorological Charts: Great Lakes (U.S. Weather Bureau), † 126, 240, 352, 587, 680; Indian Ocean (Met. Office, London), † 127, 239, 468, 587, 679; Indian Ocean (U.S. Weather Bureau), † 127, 240, 352, 587, 680; N. Atlantic and Mediterranean (Met. Office, London), † 126, 239, 468, 587, 679; N. and S. Atlantic (U.S. Weather Bureau, † 126, 239, 352, 587, 679; N. and S. Pacific Ocean (U.S. Weather Bureau), † 127, 240, 352, 587, 680
Norway: Kystkarter (Norges Geografiske Opmaaling), 240 †
Pilot Charts: Indian Ocean (U.S. Hydrog. Office), † 127, 239, 468, 587, 680; N. and S. Atlantic (U.S. Hydrog. Office), † 126, 239, 468, 587, 679; N. and S. Pacific (U.S. Hydrog. Office), † 127, 240, 468, 587, 680
Chase, J. S., Yosemite trails, 580 †
Cheshire—
Early Maps of Cheshire: W. Harrison, 454 †
Chile—
Ferrocarriles en estudio y construcción, Inspección general de, 580 †
Linea de frontera con la República de Bolivia: L. Riso-Patron, 117 †
Maps: Atlas de Monografia de las Lineas Ferreas Fiscales de Chile en estudio y construccion, 124 †
Meteorológico y Geofisico de Chile, Instituto Central. I. Observaciones en la Mina Aguila: W. Knoche, 346 †
Plano topográfico de provincias del norte: L. Riso-Patron, 117 †
Chilton, C., remarks on Antarctic Discovery at British Association, 549
China—
Baukunst und Landschaft in China: E. Boerschmann, 662 †
Canal de Sseu-ngen: P.- A. Lapicque, 662 †
Census Returns, 69
Chau Ju-kua: F. Hirth and W. W. Rockhill, 455 †

China—*continued.*
China: Sir R. K. Douglas, 74 §
China und seine jüngste Entwicklung: G. Wegener, 662 †
Chinesische Stadt: E. Tiessen, 455 †
Earthquakes, Destructive, in China: N. F. Drake, 455 †
Exploration, Récente, du Dr. Legendre: A. Legendre, 228 †
In forbidden China; the d'Ollone Mission, 1906–1909: Vicomte d'Ollone, 112 †
Labrang Monastery, A visit to: G. Pereira, 415 *
Maps: Atlas von China: Baron von Richthofen, 585 †; Eglise Catholique en Chine, 237 †; Railways, telegraphs, and treaty ports (Geog. Section, General Staff), 122 †
Men and manners of Modern China: J. Macgowan, 577 †
Mineral wealth and geology of China, Bibliography of: Chung Yu Wang, 228 †
New China: H. Borel, 205 §
Population of China, Census of 1910: W. W. Rockhill, 228 †
Reisen und darauf gegründeter Studien von F. Freiherrn v. Richthofen, 454 †
Shên-kan, Through: R. S. Clark and A. de C. Sowerby, 662 †
Transformation, China in: A. R. Colquhoun, 206 §
Chinese Empire—
Geographical observations taken during journey from Kashgar to Kowloon, Summary of: C. Clementi, 228 †
Observations made during journey through Ssuch'uan, Kansu, and Chinese Turkestan: O. R. Coales, 229 †
Chinese, The: J. S. Thompson, 633 §
Cholmeley, E. M.: *see* Melland, F. H.
Christie, W. A. K., Lonar Soda Deposit, 342 †
Chubb, T., Descriptive Catalogue of printed maps of Wiltshire from 1576 to 1885..228 †
Chudeau, R., Contribution à la carte de Mauritanie, 115 †; Ressources agricoles de la Mauritania, 665 †
Chumiumo mountain, Himalaya, 254, 255
Chusan—
Alter Plan der beiden Hauptstädte des ehemaligen Königreiches Chusan: E. Simon, 228 †
Chute, J. C., Geography Notes; British Empire, 349 †, 558 §
Cilvanet, C., Recensement de 1911 en France, 341 †
Citerni, C., Italian-Abyssinian Frontier in Somaliland, 216
Cities—
Geographische Verbreitung der Grossstädte auf der Erde: H. Hassinger, 348 †
Claparède, Arthur de: R. Gautier, 235 †
Clare, C. L., Brenner Pass, 576 †
Clark, I., Colour Photography for Mountaineers, 349 †
Clarke, R. S., and A. de C. Sowerby. Through Shên-kan, 662 †
Clarke, F. W., Data of geochemistry, 461 †
Cleland, J. B., On occurrence of explosive or booming noises (Barisal Guns) in Central Australia, 346 †
Clementi, C., R.G.S. Award to, 99; Positions determined on journey from Kashgar to Hongkong, 624; Summary of geographical observations taken during journey from Kashgar to Kowloon, 228 †
Clendenin, W. W.: *see* Arey, A. L.
Clift, H., and A. Gross, Aviation Maps, 122 †
Climatology—
Centres d'action de l'atmosphère, Quelques recherches sur les: H. Hildebrandsson, 347 †
Climate and Weather: H. N. Dickson, 80 §
Electrical Conductivity of Atmosphere over Pacific: A Nippoldt, 221
Klimate der Erde: A. Hettner, 118 †
Nachweis von Perioden langer Dauer: W. Schmidt, 118 †
Pulsatory theory of climatic changes, 264
Close, C. F., Address on purpose and position of geography, Comment on: M. K. Genthe, 349 †; letter from, on Sir C. Watson's remarks on International Map of World, 655
Clouds—
Aus der Wolkenwelt: A. de Quervain, 233 †
Coales, O. R., Observations made during journey through Ssuch'uan, Kansu, and Chinese Turkestan, 229 †
Coast—
Atlantic and Pacific Types of Coast: E. H. L. Schwarz, 294 *
Coast erosion—
Défense naturelle des rochers contre l'action destructive de la mer: M. Parvu, 347 †
Coffey, G., New Grange . . . and other incised tumuli in Ireland, 577 †
Cole, G. A. J., Problem of Liffey Valley, 560 §; Rocks and their Origin, 118 †, 439 §
Colin, E., Observations météorologiques faites à Tananarive, 457 †
Collie, G. L., Plateau of British East Africa and its inhabitants, 456 †
Collins, V. D. B., and B. T. Wyatt, Determination of positions and heights of Teram Kangri Peaks, 440, 578 †
Colombia—
Kolumbianische Erdbeben am Jan. 1906: E. Rudolph and S. Szirtes, 668 †
Oficina de Longitudes, Informe del jefe de: J. G. Nieto, 345 †

Colonial Expansion—
Histoire de l'Expansion Coloniale des Peuples Européens de la Néerlande et du Danemark: C. De Lannoy et H. van der Linden, 438 §
Colorado—
Colorado front range: W. M. Davis, 667 †
Geology and ore deposits of Breckenridge district: F. L. Ransome, 116 †
Colquhoun, A. R., China in Transformation, 206 §
Colvin, I. D., Cape of Adventure, 114 †, 207 §
Comai, L., and A. Bischofberger, Schulhandkarte der Bezirkshauptmannschaft Liezen, 464 †
Comissopulos, N. A., Tor, 579 †
Commander Islands, From an excursion to: E. R. Suvorof, 113 †
Commerce—
Geographie des Welthandels und Weltverkehrs: E. Friedrich, 640 §
World, Commerce of the, 1910: J. J. Macfarlane, 234 †
Compass—
Alte Schiffskompasse und Kompassteile im Besitz Hamburger Staatsanstalten: A. Schück, 347 †
Kompass, Der, I. 46 Tafeln und Verzeichniss derselben: A. Schück, 347 †
Congo, Belgian—
Bibliographie Congolaise de 1895 à 1910: T. Simar, 456 †
Communications par chemin de fer et par voie fluviale au Congo belge, 229 †
De Bordeaux au Tchad par Brazzaville: — Deschamps, 634 §
Frontière orientale du Congo belge, Description de la: J. Maury, 229 †
Géologie du Bassin du Kassai, Notes sur: J. Cornet, 114 †
Maps: Carte du Congo Belge (Inst. Cartographique Militaire), 123 †; Petit Atlas du Congo Belge, 123 †
Nouvelle organization territoriale de la colonie, 229 †
Populations, Anciennes, le long de la bordure occidentale du lac Moëro, A propos des traces laissés par d': M. Robert, 456 †
Riassunto del rapporto dell' ing. Percy Stoppani sull' Uellé ed Ituri, 229 †
Voies de communication et de transport au Congo Belge: M. Moulaert, 229 †
Congo, French: *see* Africa, French Equatorial
Congress—
Americanists, Eighteenth International Congress of, 318
Geological Congress, Twelfth International, 222
Conner, J. E., Forgotten ruins of Indo-China, 577 †
Constance, Lake of—
Osterreichische Bodensee-Dampfschiffahrt: K. Fuchs, 659 †
Conwentz, H., and others, Plagefenn bei Chorin, 341 †
Cook, Captain J., Photograph of memorial to: E. P. Grant, 127 †
Cooke, J., Murray's Handbook for travellers in Ireland, 577 †
Coolidge, W. A. B., Alpine Studies, 659 †; Dans les Alpes Pennines, 659 †; Entre I sère et Doire, 659 †; List of writings . . . dating from 1868 to 1912 relating to Alps or Switzerland, 452 †; Petionella-Kapelle in Grindelwald, 111 †
Coplans, M., Apparatus for recording electrical conductivity of sea water, 568
Coral—
Carte des récifs de Coraux: L. Joubin, 670 †
Cordier, H., Premier traité de France avec Japon, 578 †
Cordilleran district of Rio Negro, 615
Cordonnier, E. L., Japanese in Manchuria, 1904..112 †, 325 §
Cornet, J., Notes sur Géologie du Bassin du Kassai, 114 †
Cornish, V., On cause of Jamaica earthquake of January 14, 1907..299*; Panama Canal and its relation to British Empire, 668 †
Cornwall—
Cornish Coast and Moors: A. G. Folliott-Stokes, 342 †
England's Riviera: J. H. Stone, 342 †
Coropuna—
Ascent of: H. Bingham, 459 †
Cortese, E., Traversata del Deserto Arabico da Chena a Cossier, 114 †
Cortesi, F., Per lo sviluppo agricola della Tripolitania e della Cirenaica, 458 †
Cortier, M., Salines du Sahara Soudannais, 457 †
Cosmas—
Cosmografia di Cosma Indicopleuste: G. L. Bertolini, 463 †
Cossar, J., Notes on geography of Edinburgh district, 112 †
Costa Rica—
Geological notes on peninsula of Nicoya: J. Romanes, 580 †
Geology of part of Costa Rica: J. Romanes, 346 †
Cottes, A., Mission Cottes au Sud-Cameroun (1905-08), 434 §
Cotton, C. A., Recent movements of uplift and of subsidence near Wellington, New Zealand, 581 †
Cowles, H. C., Causes of vegetational cycles, 671 †
Cox, A. J., Philippine Soils and some of the factors which influence them, 113 †
Coxhead, J. C., letter from, on Orthography for Unwritten Languages, 655
Cracow, Royal Capital of Ancient Poland: L. Lepszy, 321 §
Craig, J. I., Evaporation in Egypt and Sudan, 579 †; Rains of Nile Basin and Nile Flood of 1910..86 §, 344 †

Craig, S., Secrets of the hills, 235 †
Crammer, H., Observations on structure and movement of Glaciers, 283, 285, 286, 293
Crampton, H. E., Latest journey to Roraima, 668 †
Cranworth, Lord, A colony in the making, etc., 578 †
Craster, J. E. E., Survey of Pemba Island, 564, 664 †
Crater Lake, Oregon, Geological history of: J. S. Diller, 668 †
Crawford, O. G. S., Distribution of Early Bronze Age Settlements in Britain, 184,* 304 *
Creed, Hon. J. M., Settlement of "Whites" of tropical Australia, 669 †
Crocker Land—
  Crocker Land Expedition: R. E. Peary and others, 581 †
  Expedition to, Reorganization of, 90
Crusoe, Robinson, a study in the new geography: C. L. Martzoeff, 463 †
Cuba—
  Géographie économique, Étude de: P. Maistre, 459 †
  Maps: Map of Cuba (War Dept., Washington), 351 †
Cuénot, A., Carte du Maroc, 123 †
Cufino, L., Ricordi della Seconda Spedizione Ruspoli. Il Diario del C. Riva, 115 †
Cumberland—
  Black Combe District, Glaciation in: B. Smith, 641
Cunynghame, Sir P., Sarawak, 662 †
Currents: *see* Oceanography
Curzon, Earl, Address to R.G.S., 1*; letter on purchase of Lowther Lodge for R.G.S., 355; remarks: at Anniversary Dinner, 100, 101; on "Garden of Eden and its Restoration," 145; "Influence of Geographical Conditions upon Japanese Agriculture," 603; "Northern Nigeria," 164; Presenting Medals, 96, 97; retirement of Sir C. Markham, 109; "Sonora Desert, Mexico," 510
Cyrenaica (*see also* Tripoli)—
  Cirenaica: R. Almagia, 458 †
  Geology of Cyrenaica, Contributions to: J. W. Gregory and others, 115 †
Czekanowski, J., Ethnographie des Nil-Kongo-Zwischengebiets, 114 †

D.

Dabbene, R., Indigenas de la Tierra del Fuego, 667 †
Dalmatia—
  Dalmatien und österreichische Küstenland: E. Brückner and others, 550 §
Dalton, L. V., On geology of Venezuela, 668 †; Venezuela, 637 §, 669 †
Daneš, J. V., Geographical and politico-economical problems of Commonwealth of Australia, 117 †
Danube—
  Roman Cities along Course of, 628
Dardanelles—
  Dardanellen: A. Janke, 454 †
  Dardanos Town, Asia Minor, 32
Darton, N. H., Sandstone pinnacles, 670 †
Darwin, Sir G., remarks on receiving R.G.S. Gold Medal, 98
Darwin, L., On personal characteristics of great explorers, 349 †; remarks: "Some New Zealand Volcanoes," 23; "The Tyne," 482
Datil national forest, United States, 403
Dautremer, J., Colonie modèle: Birmanie sous la régime britannique, 312 †, 633 §
D'Auvergne, E. B., Switzerland in Sunshine and Snow, 205 †
David, T. W. E., and others, New South Wales, 581 †, 639 §
Davies, L., Radnorshire. Cambridge County Geographies, 577 †
Davies, W. M., Colorado front range, 667 †; Erklärende Beschreibung der Landformen, 670 †; Esprit explicatif dans la géographie moderne, 349 †
Davis Straits, Eskimos of, in 1656: D. MacRitchie, 460 †
Davison, C., Origin of earthquakes, 120 †
Dawson, W. B., Progress of tide in deep inlets and ordinary estuaries, 580 †
De Agostini, G., Calendario-Atlante, 125 †; Mar Rosso e Possedimenti Italiani in Africa, 122 †
Deb Tal or Deo Tal, Tibet, 333
Debes, E., Neuer Handatlas über alle Teile der Erde, † 125, 238, 351, 467, 586, 678
Debrand, Étude sur le pays Koudou Djouah, 114 †
Deeley, R. M., Observations on glaciers, 289, 293; Viscosity of Ice, 462 †
Dee Valley—
  Glacial changes in Lower Dee Valley: L. J. Wills, 660 †
Dehalu, M., Rôle de télégraphie sans fil dans cartographie coloniale, 232 †
Dehérain, H., Dans l'Atlantique; Saint-Hélène, etc., 666 †; Occupation de Tristan da Cunha par Grande-Bretagne, 458 †
Delafosse, M., Haut-Sénégal-Niger (Soudan Français), 114 †
Delage, Y., Bathyrhéomètre à enregistrement continu des directions et des vitesses des courants de fond, 582 †
Delingette, G., Carte Générale de l'Afrique Équatoriale Française, 350 †
Dellenbaugh, F. S., Cross-cutting and retrograding of stream-beds, 671 †
Delos—
  Exploration archéologique de Délos: L. Cayeux, 226 †
Delpech, J., Troisième excursion en Suisse du Laboratoire de géographie physique de l'Université de Paris, 227 †
Demangeon, A., Navigation intérieure en Grande-Bretagne, 454 †

Dempster, H. G., Notes on a system of surveying with a Tacheometer, 347 †
Dent, C. T., obituary, 572
Dent's Historical and Economic Geographies: H. Piggott and R. J. Finch, 672 †
Denton, Sir G., Twenty-three years in Lagos and Gambia, 230 †
Denucé, J., Expéditions polaires depuis 1800 . . 118 †
Denudation—
Abtragung durch Wasser, Temperatur gegensätze und Wind, etc.: S. Passarge, 347 †
Deschamps, —, De Bordeaux au Tchad par Brazzaville. 634 §
Desert plants, Water relations of: D. T. MacDougal, 120 †
Deserts—
Gesetz der Wüstenbildung in Gegenwart und Vorzeit: J. Walther, 581 †
Dettmann, E., Moderne Brasilien in seiner neuesten wirtschaftlichen Entwicklung, 668 †
Diala river, Mesopotamia, 502
Dickson, H. N., Climate and Weather, 80 §; Maps; how they are made; how to read them, 347 †, 438 §
Diener, C., Trias of Himalayas, 343 †
Dieterich, K., Byzantinische Quellen zur länder- und Völkerkunde, 556 §
Dietrich, B., Entstehung und Umbildung von Flussterrassen, 348 †
Dihong—
Suspension bridge, Native, over the Dihong, 213
Diller, J. S., Major Charles Edward Dutton, 349 †; Geological history of Crater Lake, Oregon, 668 †
Dirr, A., Anthropologische . . . Uebersicht über die Völker des Kaukasus, 456 †
Discovery. Log Book of: A. B. Armitage, 581 †
Dittenbergen, H., Der Lac Lioson, 659 †
Dneipr and Duna Canal Scheme, 642
Dodge, R. E., Some geographic relations illustrated in practice of agriculture, 463 †
d'Ollone: *see* Ollone
Donegal—
Drumlin Topography of South Donegal: W. B. Wright, 454 †; Submerged forests . . . in Donegal, On occurrence of: W. B. Wright, 454 †
Dorno, P. C., Studie über Licht und Luft des Hochgebirges, 80 §
Doughty, C. M., R.G.S. Medal awarded to, 96
Douglas, A. J., Photographs of Southern Morocco, 128 †
Douglas, Sir R. K., China, 74 §
Douglas, R. S., An expedition to Bali, Country of Central Borneo, 455 †
Dowling, D. B., Canadian Coal resources, 666 †
Dracopoli, I. N., Photographs of Arizona, 127; Sonora Desert, Mexico, 511 *
Drake, N. F., Destructive earthquakes in China, 455 †
Drake-Brockman, R. E., British Somaliland, 665 †
Drake Documents discovered by Mrs. Z. Nuttall, 621
Dryer, C. R., High School Geography, 349 †, 558 §
Drygalski, E. v., Observations on glaciers, 289, 293
Dumas, L., Distribution mondiale des forêts, 671 †
Dumfries—
Cambridge County Geographies. Dumfries-shire: J. K. Hewison, 227 †
Duncker, A., Grosser Atlas der Eisenbahnen von Mittel-Europa, 236 †
Dunstan, W., remarks on "Northern Nigeria," 167
Dutch Colonies—
Colonisation chez les Hollandais: J. Leclercq, 235 †
Duthie, J. F., Flora of Upper Gangetic plain, 662 †
Du Toit, A. L., Physical Geography for South African Schools, 329 §
Dutton, C. E. (Biography): J. S. Diller, 349 †; obituary, 92
Dybowski, J., Le Congo Méconnu, 553 §

E.

Earn, Loch—
Temperature distribution in Loch Earn, Investigation of: E. M. Wedderburn, 228 †
Earth—
Depth of zone of flow in Earth's Crust, Experimental Contribution to question of: F. W. Adams, 338 §, 461 †
Gezeiten der festen Erde und hypothetische Magmaschicht, Untersuchungen über: W. Schweydar, 582 †
Land and Water areas on Earth's Surface, Measurement of: H. Wagner, 568
Limiting strength of rocks under conditions of stress existing in Earth's interior: L. V. King, 461 †
Making of the Earth: J. W. Gregory, 640 §, 670 †
Movimento del suolo nell' ultimo cinquantennio, Lo Studio dei: C. de Stefani, 119 †
Régime des gaz dans l'écorce terrestre: V. I. Vernadskij, 233 †
Terre, La, Géographie Générale: P. C. d'Almeida, 439 §
Earthquakes—
Catalogue of destructive earthquakes: J. Milne, 462 †
Catalogue of Earthquakes in 1907 (International Seismological Association), 648
Earthquake epicenters: O. Klotz, 671 †
Dispersion und Dämpfung der seismischen Oberflachenwellen: B. Galitzin, 234 †

Earthquakes—*continued.*
Origin of earthquakes: C. Davison, 120 †
East—
Isochronenkarte des Orients: E. Banse, 463 †
Sea road to the East: A. J. Sargent, 235 †, 559 §
Wüsten, Steppen, Wälder und Oasen des Orients: E. Banse, 121 †
Eastern voyages—
Premiers Voyages des Français dans l'Extrême-Orient: P. Gaffarel, 234 †
Eckert, M., Entwicklung und gegenwärtiger stand unserer Kolonial kartographie, 349 †; Wirtschafts-Atlas der Deutschen Kolonien, 351 †
Ecuador—
Maps: Provinces of Manabi and Guayas, Ecuador: M. H. Saville, 238 †
Ede, C., obituary, 450
Eden, Garden of, and its restoration: Sir W. Willcocks, 129 *
Edinburgh—
Geography of Edinburgh district, Notes on: J. Cossar, 112 †
Edremid, Plain of, Asia Minor, 27
Educational—
School visits and journeys: H. Piggott, 82 §
Teaching of modern subjects: geography: J. Welton and W. P. Welpton, 121 †, 557 §
Edwards, A., Panama, 76 §
Egmont, Mount, New Zealand, 19
Egypt—
Canal Abbas II., Encore le: Abbate Pache, 344 †
Deserts of Egypt, Investigations in: D. T. MacDougal and G. Sykes, 86
Eastern Desert of Egypt, Geological Expedition into: W. F. Hume, 215 §, 579 †
Evaporation in Egypt and Sudan: J. I. Craig, 579 †
Geological map of Egypt, Explanatory notes: W. F. Hume, 579 †
Magnetic observations made . . . at Khedivial Observatory, 664 †
Magnetic Survey of Egypt (Survey Dept.), 344 †
Maps: Map of Delta (Egyptian Survey Dept.), 466 †; Topographical map of Egypt (Egyptian Survey Dept.), 466 †
Meteorite of El Nakhla el Baharia: J. Ball, 344 †
Survey Dept., 1910, Report on Work of, 114 †
Tor: N. A. Comissopulos, 579 †
Traversata del Deserto Arabico da Chena a Cosseir: E. Cortese, 114 †
Eifel: O. Follmann, 341 †
Elba: A. Rühl, 452 †
Elbe—
Terrassen der Moldau-Elbe: R. Engelmann, 659 †
Elbruz—
Nordwestliche Abhang des Elbrus: A. Gerassimov, 663 †
Ellison, H. K., Australia's transcontinental railway, 460 †
Emerson, F. V., Geographic interpretation of New York City, 459 †
Emmons, G. F., Tahltan Indians, 231 †
Encyclopædia—
Encyklopädie der Mathematischer Wissenschaften, 463 †
Endriss, W., Ueber den Taurus, 456 †
Engelmann, R., Terrassen der Moldau-Elbe zwischen Prag und dem Böhmischen Mittelgebirge, 659 †
England—
Canal, To West of England by: R. J. Finch, 227 †
Holiday walks in North-Countree: H. Wild, 660 †
Maps: Road map from London to Coast: A. Gross, 673 †
England and Wales—
Maps: Ordnance Surveys, † 121, 464, 583, 673 †
Enock, C. R., Secret of Pacific: a discussion of origin of early civilizations of America, 116 †, 641 §
Eredia, F., Climatologia di Tripoli e Bengasi, 458 †; Il clima di Roma, 226 †
Eridu, Mesopotamia, 131, 132
Erie Canal: C. T. MacFarlane, 459 †
Eritrea—
Caffé nella colonia Eritrea, Il commercio del: N. Checchi, 664 †
Erosion—
Erosion and its significance: E. C. Andrews, 347 †
Erosion der Meeresbrandung, Ueber die: J. Rekstad, 347 †
Erosion éolienne et ses effets dans régions désertiques: C. Vélain, 233 †
Eskers—
Relations of Kames and Eskers: J. W. Gregory, 169 *
Eskimo, White tribe, in Northern Canada, 443
Espada, M. J. de la, Book of knowledge of all kingdoms, lands and lordships that are in the world, etc. Translated by Sir C. Markham, 120 †
Esslemont, A. S., remarks on "The Tyne," 484
Etna—
Eruption of Sept. 1911: G. Platania, 560; Ditto: A. Sieberg, 561
Euphrates—
Ancient history of, 130
Floods of Euphrates, Control of, 137, 139
Europe—
Bodenbewegungen in Mittel und Südeuropa: G. Braun, 340 †
Einfluss glazialer und postglazialer Verhältnisse auf die niedere Tierwelt Mitteleuropas: V. Brehm, 340 †

Europe—*continued.*
Geography, A supplementary: J. F. and A. H. Chamberlain, 225 †, 558 §
Geography of Europe: T. A. Smith, 121 †, 558 §
Maps: Automobil- und Radfahrer-Karten: G. Freytag, 465 †, 584 †; Grosser Atlas der Eisenbahnen von Mittel-Europa: A. Duncker, 236 †; Mitteleurope, Karte von (K. u. K. Institut), 674 †; Sifton Praed's Map of Central Europe, 674 †; Uebersichtskarte von Europe (K. u. K. Militargeo. Institut), 674 †; Uebersichtskarte von Mitteleuropa (K. Preuss. Landesaufnahme), 584 †
Massif central français et massif de Bihar: L. Sawicki, 340 †
Palæolithic man and Terramara settlements in Europe: R. Munro, 660 †
Evans, Sir A., remarks on "Distribution of Early Bronze Age Settlements in Britain," 198
Evans, J. W., remarks on "Distribution of Early Bronze Age Settlements in Britain," 201
Evaporation—
Verdunstung auf dem Meere: R. Lütgens, 91 §, 119 †
Eveleigh, G., Cape Verde Islands, 344 †
Explorers—
Personal characteristics of great explorers: L. Darwin, 349 †

F.

Fabiani, R., Formes singulières d'érosion dans les breccioles basaltiques des monts Lessini, 452 †
Fage, L., Essais d'Acclimatation du Saumon dans le Bassin de Méditerranée, 462 †
Fairgrieve, J. (*see also* Young, E.), remarks on "Thermal Regions of the Globe," 531
Falkland Islands—
Geological structure and history of Falkland Islands: T. G. Halle, 346 †
Faris, R. L., Distribution of magnetic declination in United States for January 1, 1910. . 345 †
Farrar, R., Plague in Manchuria, 577 †
Fars, Province of, Description of: G. Le Strange, 229 †
Fatio, G., Un Genevois à Babylone en 1873. Extrait du récit d'un voyage des Indes . . . d'après le manuscrit de l'auteur A. Pictet, 456 †
Fawcett, P. H., Informe sobre el trabajo de la Comision en el N.O. de la Frontera (Bolivia), 231 †
Fehlmann, J. W., Tiefenfauna des Luganer Sees, 659 †
Fenland: W. J. Willcock, 111 †
Ferguson, H. G., Geology and mineral resources of Aroroy district Philippines, 663 †
Fernández, J., Clima, aguas, suelos de Provincia de Santiago del Estero, 117 †
Ferrandi, J.: *see* Lame
Fichelle, A., Études de géographie humaine sur quelques communes de haute vallée de la Deûle, 452 †
Figueiredo, J. de, Arte Portugueza Primitiva, 234 †
Fiji, Agriculture in, 590
Filane tribe, Nigeria, 154
Filek, E. v., Geographischen Vorstellungen in Altertum, 463 †
Filippi, F. de, Proposed Scientific Expedition to Karakoram, 559
Finch, R. J., To West of England by canal, 227 †
Finland—
Atlas de Finlande, 321 §
Finland: E. Young, 72 §
Finsterwalder, S., Observations on glaciers, 283, 288, 289, 291, 293
Fiords in relation to Earth-movements: J. W. Gregory, 347 †
Fiscal problem, Old-time solutions of: K. D. Cotes, 672 †
Fischer, J., Handschriftliche Ueberlieferung der Ptolemäuskarten, 672 †; Manuscript Succession of Ptolemy's Maps, 649
Fischer, W., and others, Aus dem zentralen Caucasus, 113 †
Fisher, J. R., Historical Geographies, South Africa, 665 †
Fisheries—
Sea Fisheries: M. A. Hérubel, 83 §
Fishes—
Poissons provenant des campagnes du yacht Princesse Alice: E. Zugmayer, 462 †
Fishing—
Pêche chez les peuples primitifs: R. Legendre, 234 †
Flemming, C., Die Balkanländer (maps). 673 †
Fletcher, A. C., and F. La Flesche, Omaha Tribe, 117 †
Flinders, Captain, Historical Sketch of life of: G. G. McCrae, 235 †
Florence—
Wanderer in Florence: E. V. Lucas, 660 †
Florida—
Railroad across Florida Keys, Completion of: R. M. Harper, 345 †
Folliott-Stokes, A. G., Cornish coast and moors, 342 †
Follmann, O., Die Eifel, 341 †
Forch, C., Die Fallung feiner Tontrübungen in Salzlösungen, 462 †
Fordham, Sir H. G., Descriptive catalogues of maps, 235 †; Notes on British and Irish Itineraries and Road Books 539
Forel, F. A., obituary, 651
Forest Physiography: I. Bowman, 208 §
Forests—
Distribution mondiale des forêts: L. Dumas, 671 †

Formosa—
Icones of plants of Formosa, etc.: B. Hayata, 578 †
Topographical and Geological Map of Formosa, Explanatory text of: Y. Ishii, 455 †.
Forth—
Story of the Forth: H. M. Cadell, 454 †
Foster, W., English factories in India, 1637-1641..343 †
Fowler, G. H., Science of the Sea, 233 †, 412 §
Fowler, J. S., and W. Marriott, Our Weather, 436 §
Fox, F., Problems of Pacific, 348 †, 639 §
France—
Analogies between Central Massif of France and Eastern Carpathians: L. Sawicki, 83
Census Returns, 60
Chaleur solaire à la surface de la France, Sur distribution de: J. Loisel, 111 †
Changements hydrographiques produits par volcans de chaîne des Puys: P. Glangeaud, 452 †
Géographie humaine sur quelques communes de haute vallée de Deûle, Etudes de: A. Fichelle, 452 †
Maps: Carte de France: Ministre de l'Intérieur, 350 †, 674 †; Carte Michelin, 122 †, 465 †
Photographs: A. W. Brown, 127 †
Recensement de 1911 en France: C. Cilvanet, 341 †
Segalas du Rouergue: M. Brienne, 340 †
Tables d'orientation et l'éducation géographique du public: P. Glangeaud, 341 †
Transhumance dans région Montpelliéraine, Etude sur: M. Sorre, 213 §, 452 †
Francotte, C., Appareil pour préparation et triage du plankton, 233 †
Frandsen, H. E., Contributions to knowledge of Ea t Coast of Gulf of Siam, 456 †
Frech, F., Ueber die Lawinen der Alpen, 225 †
Freer, P. C., Tropical sunlight, 463 †, 650 §
Freshfield, D. W., remarks on "Mountains of Northern Sikkim and Garhwal," 260
Frew, D., Junior Geography of Scotland, 342 †
Freytag, G., Automobil- und Radfahrer-Karten, 465 †, 584 †; Touristen-Wanderkarten, 464 †
Fric, A., on tribes of Brazil, 319
Friederichsen, M., Vorpommerns Küsten und Seebäder, 576 †
Friederici, G., Südsee-Inseln, 118 †
Friedrich, E., Geographie des Welthandels und Weltverkehrs, 640 §
Friedrich, W., Historische Geographie Böhmens, etc., 225 †
Frijoles, Canyon de los, Ruins in, 398
Fromm, D. P., Ufipa—Land and Leute, 664 †
Fromm, L., Hohenbestimmungen in Deutsch-Ostafrika, 579 †
Früh, J.: *see* Maurer, J.
Fuad-Bei, Mehemed Raif, Land und Leute im heutige Jemen, 661 †
Fuchs, K., Osterreichische Bodensee-Dampfschiffahrt, 659 †
Funke, M., Geographische Verbreitung der Kopfjagd, 348 †

G.

Gaffarel, P., Premiers Voyages des Français dans l'Extrême-Orient, 234 †
Gaillard, E., Alpes de Savoie, 341 †
Gait, E. A., Indian Census, 342 †
Galitzin, B., Ueber die Dispersion und Dämpfung der seismischen Oberflächenwellen, 234 †
Gallichan, G. C., Santiago, 432 §
Gallois, L., Quelques études de Villes, 672 †
Galna fort, Western India, Rock cistern at, 183
Gambia—
Gambia; its history, etc.: H. F. Reeve, 74 §
Mandingo language, Vocabulary of: E. Hopkinson, 666 †
Twenty-three years in Lagos and Gambia: Sir G. Denton, 230 †
Gand—
Maps: Plan instantané de la Ville de Gand: A. Hoste, 349 †
Ganges—
Rivers of the Delta: F. D. Ascoli, 343 †
Ganong, W. F., Organization of Scientific Investigation of Indian Place-nomenclature of Maritime Provinces of Canada, 580 †
Gardet, G., Histoire du Katanga, 229 †
Gardiner, J. S., Percy Sladen Trust Expedition to Indian Ocean in 1908.. 348 †
Garhwal—
Mountains of Northern Sikkim and Garhwal: A. M. Kellas, 241 *
Gaunt, M., Alone in West Africa, 435 §
Gautier, E. F., Profils en long de cours d'eau en Algérie-Tunisie, 114 †
Gautier, R., Arthur de Claparède, 235 †
Gavazzi, A., Verschiebung der Meeresgrenze in Kroatien und Dalmatien in historischer Zeit, 659 †
Gazelle Halbinsel: W. Wernicke, 460 †
Geer, G. de, Earth Movements round North Atlantic, 647
Geer, S. de, Klarälfvens serpentinlopp och flodplan, 577 †; Storstäderna vid Ostersjön, 340 †
Geerligs, H. C., World's cane sugar industry, 672 †
Geest, E. de, Kaart van Nederland met

de Spoor-, Tram- en Scheepvaartwegen, 122 †
Gehne, H., Eine neue Methode geomorphologischer Kartendarstellung, 671 †
Geikie, J., "Deeps" of Pacific Ocean and their origin, 462 †
Gemira country, Abyssinia, 379
Geneva, Lake of—
Researches by F. A. Forel, 651
Genthe, M. K., Comment on Colonel Close's address on purpose and position of geography, 349 †
Gentil, L., Maroc physique, 344 †; Sur la tectonique du Haut Atlas Marocain, etc., 457 †
Geochemistry, Data of: F. W. Clarke, 461 †
Geodesy—
Berechnungsformeln des Erdsphäroides und die Besselschen Konstanten: A. Böhm, 347 †
Longueur de l'arc minimum du méridien d'un ellipsoïde de révolution à volume constant: Baron B. Harkányi, 232 †
Lossiemouth, Account of Measurement of Geodetic Base Line at (Board of Agriculture and Fisheries), 555 §, 661 †
Seizième Conférence Générale de l'Association Géodésique Internationale, 1909, Comptes rendus des séances de, 232 †
Geographical Exploration, History of: E. Heawood, 672 †
Geographical Investigation, Future of, 3
Geographical Literature of Month—
Africa, 114, 229, 343, 456, 578, 663
America, 116, 230, 345, 458, 580, 666
Anthropogeography and Historical Geography, 120, 234, 348, 463, 582, 671
Asia, 112, 228, 342, 454, 577, 661
Australasia and Pacific Islands, 117, 232, 346, 460, 581, 669
Biography, 235, 348, 582, 672
Europe, 110, 225, 340, 451, 575, 659
General, 121, 235, 349, 463, 583, 672
Mathematical Geography, 118, 232, 347, 461, 670
Physical and Biological Geography, 118, 232, 347, 461, 581, 670
Polar Regions, 118, 232, 346, 460, 581, 669
Geographisches Jahrbuch: H. Wagner, 463 †
Geography—
Association of History and Geography: A. J. Berry, 211 §
British Association, Geography at: E. A. Reeves, 537 *
Business geography: J. H. Birrell, 582 †
Byzantinische Quellen zur Länder- und Volkerkunde: K. Dieterich, 556 §
Canada, Federal Bureau of Geography for, 620
Clarendon Geography: F. D. Herbertson, 211 §
Geography—*continued*.
Commercial Geography: J. W. Redway, 82 §
Commercial Geography by J. F. Unstead and E. G. R. Taylor, letter from Authors on, 223; letter from the Reviewer on, 94
Economische aardrijkskunde, Handleiding bij de beoefening: C. M. Kan, 234 †
Ensayo de analisis y sintesis geográficas: C. G. Alonso, 121 †
Enseñanza de la Geografía en la política exterior de las naciones, Influencia de: J. R. Giralt, 463 †
Erd- und Kulturkunde, Quellen und Forschungen zur: R. Stübe, 556 §
Esprit explicatif dans géographie moderne: W. M. Davis, 349 †
Essentials of world geography: J. F. Unstead and E. G. Taylor, 673 †
General geography, First book of: B. C. Wallis, 583 †
Geographie: E. Banse, 121 †
Géographie en Allemagne et en Autriche: F. Kraentzel, 349 †
Geographischen Vorstellungen in Altertum: E. v. Filek, 463 †
High School Geography: C. R. Dryer, 349 †, 558 §
Historical and Economic Geographies: H. Piggott and R. J. Finch, 672 †
Kulturgeografien i Skolan: H. Nelson, 235 †
Oxford Geographies. Elementary geography. Vols. 5 and 6: F. D. Herbertson, 583 †
Philosophy of geography: W. E. McCourt, 463 †
Physical geography, Class book of: A. T. Simmons and E. Stenhouse, 236 †
Physical Geography for South African schools: A. L. du Toit, 329 §
Physical geography, Introduction to: M. I. Newbigin, 582 †
Physiography for High Schools: A. Arey and others, 582 †
Position and definition, 359
Position of Geography in Scottish Schools: T. S. Muir, 541
Practical Geography, Class Book of: E. Young and J. Fairgrieve, 82 §
Preliminary geography, new: H. B. Wetherill, 583 †
Purpose and position of geography, Comment on Colonel Close's address on: M. K. Genthe, 349 †
Quantitative Geography, Use of Formulæ in: B. C. Wallis, 175 *
Regional Geography; World: J. B. Reynolds, 349 †, 557 §
Teaching of elementary geography, Symposium upon what is most needed in: W. M. Gregory, 235 †
Teaching of geography, Use of practical exercises in: R. N. R. Brown and others, 463 †

Geography—*continued.*
Teaching of Modern Subjects: Geography: J. Welton and W. P. Welpton, 121 †, 557 §
Welthandels und Weltverkehrs Geographie des: E. Friedrich, 640 §
Zones et biochores géographiques: M. Vahl, 234 †
Geological Congress, Twelfth International, 222
Geomorphology—
Landformen, Erklärende Beschreibung der: W. M. Davis, 670 †
Neue Methode geomorphologischer Kartendarstellung: H. Gehne, 671 †
Physiologische Morphologie: S. Passarge, 461 †
Significato delle geoforme elementari in geomorfogenesi: G. Azzi, 670 †
Ursachen und Einteilung einiger Massenbewegungen: F. Machatschek, 671 †
Gerassimov, A., Nordwestliche Abhang des Elbrus, 663 †
Germain, L., Deux anciens instruments d'Oceanographie, 671 †; Sur l'Atlantide, 232 †
German colonies—
Kolonialkartographie, Entwicklung und gegenwärtiger Stand unserer: M Eckert, 349 †
Maps: Wirtschafts-Atlas der Deutschen Kolonien: M. Eckert, 351 †
German Empire, Crown Prince of, From my hunting day-book, 583 †
Germany—
Census Returns, 62
Deutsche Vorgeschichte: G. Kossinna, 341 †
Geologischer Führer durch das Mainzer Tertiärbecken: C. Mordziol, 576 †
Germanischen Stämme und die Kulturen zwischen Oder und Passarge zur römischen Kaiserzeit: E. Blume, 226 †
Geschichte der deutchen Landschaft: O. Schlüter, 341 †
Grossstädte, Lage der deutschen: A. Penck, 226 †, 628 §
Jungendmoränen in Norddeutschland: E. Werth, 576 †
Maps: Deutschen Wasserstrassen: Sympher, 350 †; Karte des Deutschen Reichs: C. Vogel, 237 †; Karte des Deutschen Reiches (K. Preuss. Landesaufnahme), 236 †, 584 †; Karte des Deutschen Reiches (K. Sächs. Generalstabes), 236 †; Uebersichts-Karte der Vereinigten Preussischen und Hessischen Staatseisenbahnen, 584 †
Norddeutschen Moore: B. Tacke und B. Lehmann, 576 †
Settlements, Ancient, Distribution of: O. Schlüter, 212
Geysers: W. H. Weed, 461 †
Gharian, Tripoli, 534
Gibbe river and falls, Abyssinia, 375, 377
Gignoux, M., Ancora due parole sulla geomorfologia della Calabria, 452 †
Gila National forest, United States, 403
Gill, Sir D, remarks on "Work of Research Department," 368
Gillen, F. J.: *see* Spencer, B.
Giralt, J. R., Influencia de la enseñanza de la Geografía en política exterior de las Naciones, 463 †
Girardin, P., Topologie et topographie, 233 †
Gironcourt, G. de, Sommet de boucle du Niger, 344 †
Glacial Epoch—
Wurde die Eiszeit durch eine Temperaturerniedrigung hervorgerufen oder nicht? F. Nölke, 119 †
Glacier National Park, United States, 565
Glaciers—
Acque in terraferma e i fenomeni glaciali secondo gli studi dell' ultimo cinquantennio: C. de Stefani, 461 †
Structure and Movement of Glaciers of Alpine Type, Some recent observations and Theories on: A. G. Ogilvie, 280 *: Bibliography, 293
Glangeaud, P., Changements hydrographiques produits par volcans de chaîne des Puys, 452 †; Tables d'orientation et l'éducation géographique du public, 341 †
Glasgow—
Earthquake of December 14, 1910: J. W. Gregory, 661 †
Gleditsch, K., Aschehougs Lommeatlas over Norge, 675 †
Gmelin, O., Johann Georg Gmelin, 1709–1755, der Erforscher Sibiriens, 343 †
Godfrey, S. H., A Summer Exploration in Panjkora Kohistan, 45 *
Goia tribe, Brazil, 319
Gojeb river, Abyssina, 376, 377
Gold lunulæ, sites of discovery, etc., 304
Goldberg, G., Marokkos Eisen-rze in ihrer wirtschaftlichen Beziehung zu Deutschland, 230 †
Gomme, Sir L., making of London, 321 §
Gongu-Hrólfs-saga: J. W. Hartmann, 672 †
Goode, J. P., Forests of Philippines, 455 †
Goshen, Land of: R. H. Brown, 435 §
Gotland—
Hufvuddragen af Gotlands fysiskit-geografiska utveckling efter istiden: H. Munthe, 453 †
Götz, Wilhelm: D. J. Reindl, 235 †
Götzinger, G., Die Lunzer Seen, 225 †
Goujon, G., La Puisaye, 341 †
Gowland, W., remarks on "Influence of Geographical Conditions upon Japanese Agriculture," 604
Grabham, G. W., Country north of Lake Albert, 539
Gran Quivira ruins, New Mexico, 393
Grand Mountain, Selkirks, First ascent of: H. Palmer, 580 †

Grant, C. F. and L., 'Twixt Sand and Sea, 206 §
Grant, E. P., Photograph of Memorial to Captain J. Cook, 127 †
Grant, L.: *see* Grant, C. F.
Grasset, —, A Travers la Chaouïa, 553 §
Gravel as a resistant rock: J. L. Rich, 118 †
Greece—
Inselreisen: L. Ross, 341 †
Maps: Map of Greece (Greek General Staff), 237 †, 674 †
Greely, A. W., American discoverers of Antarctic continent, 460 †
Greenland—
Bilder aus Grönland: A. Stolberg, 669 †
Carlsbergfondets Expedition til Øst-Grønland: G. Amdrup, 581 †
Cartographia Groenlandica: A. A. Bjørnbo, 670 †
Danish Expedition to East Greenland, 1906-8, Cartographical Results, 446
Danmark-Ekspeditionens Kort: J. P. Koch, 347 †
Expeditions: Mikkelsen's, 337
Expeditions across Greenland by A. de Quervain and J. P. Koch, 566
Fortidige Bebyggelse of Grønlands Nordøstkyst: C. B. Thostrup, 347 †
Geology of country round Julianehaab: N. V. Ussing, 670 †
Glaciologischen Beobachtungen der Danmark-Expedition: J. P. Koch und A. Wegner, 554 §
Grönlands Eisberge: A. Heim, 118 †
Travels and Botanical investigations in East Greenland: C. Kruuse, 670 †
Gregory, J. W., Fiords in relation to Earth-movements, 347 †; Glasgow Earthquake of December 14, 1910.. 661 †; Making of the Earth, 640 †, 670 †; Relations of Kames and Eskers, 169 *; Resources of Tripoli, 115 †; and others, Contributions to geology of Cyrenaica, 115 †
Gregory, W. M., Symposium upon what is most needed in teaching of elementary geography, 235 †
Greim, G., Beiträge zur Anthropogeographie des Grossherzogtums Hessen, 341 †
Grein, K., Hilfsmittel für direkte Strommessungen in grossen Meerestiefen, 582 †
Greindl, L.: *see* Jerome, A.
Grindelwald—
l'etionella-Kapelle in Grindelwald W. A. B. Coolidge, 111 †
Grodno—
Geologie des Gouvernements Grodno, Materialen zur: A. Missuna, 453 †
Groll, M., Alte und neue Seekarten, 670 †; Erste preussische Seeatlas 1749 "Nouvel atlas de Marine," 678 †
Gross, A. (*see also* Clift, H.), "African World" map of West Africa, 124 †; *Daily Chronicle* War Map of Balkans, 673 †; Map of London, 674 †; Plan of Manchester, 674 †; Road Map of London to Coast, 673 †
Grund, A., Vierte Terminfahrt S.M.S. *Najade* in der Hochsee der Adria, 1911..439 §, 451 †
Gueluy, A., Ferdinand Verbiest, 235 †
Guenther, K., Einführung in die Tropenwelt, 112 †; Gerhard Rohlfs, 672 †
Guiana—
British, French, and Dutch: J. Rodway, 232 †, 554 §
Guiana, British—
Boundaries of: J. A. J. de Villiers, 668 †
Dutch, Expedition in: L. van Panhuys, 319
Guillotel, F., Ressources minérales des États-Unis, 231 †
Guinea, French—
Boundary between Sierra Leone and French Guinea, 643
Gulf Stream—
Gulf Stream dans les mers de l'Europe occidental: C. Cépède, 119 †
Letter from H. H. Prichard on Gulf stream, 95
Gunter, —, Further Surveys in Abor Country, 563
Günther, R. T., Oxford country, 227 †, 432 §
Günther, S., Durchlöcherte Berge und orographische Fenster, 119 †

H.

Habbania escape, Euphrates, 138
Häberle, D., Ueber einen durch Blitzschlag verursachten Felsabsturz im Mittelgebirge, 659 †
Habib, Wadi, Egypt, 215
Hagemans, P., Au canal de Panama, 580 †
Hagen, H. B., Algerisch-tunesische Atlasgebirge, 664 †
Hagenbach-Bischoff, E., Observations on glaciers, 288, 293
Hague, A., Geological history of Yellowstone National Park, 668 †
Halbfass, W., Former Glaciation in Northern Spain, 642; Gibt es im Madüsee Temperaturseiches? 576 †; Topographie . . . der aussereuropäischen Seen, 582 †
Hall, A. L., Geology of Murchison Range and District, 666 †
Hall, R. N., Present position of discussion as to origin of Zimbabwe culture, 665 †
Halle, T. G., On geological structure and history of Falkland Islands, 346 †
Hamilton, A., Abor Expedition, 342 †; In Abor Jungles, 662 †; Mishmi Mission, 343 †
Hamilton, Sir R. Vesey, obituary, 570
Hammer, E., Land und Wasser auf der Erdoberfläche, 462 †
Hänsch, F., Aufteilung Afrikas, 664 †

Hardie, R. P., Tobermory argosy, 227 †, 432 §
Harkányi, Baron B., Sur longueur de l'arc minimum du méridien d'un ellipsoïde de révolution à volume constant, 232 †
Harnden, E. W., Climbs in Southern Selkirks, 580 †
Harper, R. M., Completion of railroad across Florida Keys, 345 †; Relation of climax vegetation to islands and peninsulas, 231 †; River-bank vegetation of lower Apalachicola, 116 †
Harrison, W., Early maps of Cheshire, 454 †
Harrisse, Henry: H. Vignaud, 235 †
Hartley, C. G., Story of Santiago de Compostella, 111 †
Hartmann, J. W., Gongu-Hrólfssage, 072 †
Hassert, K., Lakes of Kamerun, 216
Hassinger, H., Geographische Verbreitung der Grosstädte auf der Erde, 348 †
Hatch, F. H., Past, Present, and Future of Gold Mining Industry of Witwatersrand, 115 †
Hausa tribe, Nigeria, 155
Haverfield, F., Romanization of Roman Britain, 660 †
Hawaii—
  Photograph of memorial to Captain James Cook: E. P. Grant, 127 †
  Studien am Kilauea: W. Penck, 669 †
Hawaiki, original home of the Maori: S. P. Smith, 232 †
Hawash river and plain, Abyssinia, 373
Hayata, B., Icones of plants of Formosa, etc., 578 †
Hayford, J. F., and W. Bowie, Effect of topography and isostatic compensation upon intensity of gravity, 117 †
Hayne, R., Photographs of Somaliland and Abyssinia, 588 †
Head-hunting—
  Geographische Verbreitung der Kopfjagd: M. Funke, 348 †
Headlam, C., Provence and Languedoc, 660 †
Heaton, E. W., Atlantic seaboard and North America, 345 †
Heawood, E., History of Geographical Exploration, 672 †
Hedley, C., Continental Margin of Eastern Australia, 90
Heim, A., Ueber Grönlands Eisberge, 118 †; and P. Arbenz, Karrenbildungen in den Schweizeralpen, 225 †
Hei-ts'o, North-West China, 419
Helland-Hansen, B., Physical oceanography, 415
Hellmann, G., and H. H. Hilderbrandsson, Internationaler Meteorologischer Kodex, 233 †
Hennig, R., Russische Grossschiffahrtswege, 229 †
Henry, A. J., Temperature at Mount Weather, etc., 668 †; Variations of temperature . . . in Central Rocky Mountain Region, 231 †
Henry of Portugal, Prince, and his political, commercial, and colonizing work: C. R. Beazley, 463, † 569 §
Henshaw, J. W., Trip to interior of Vancouver Island, 444
Herald Island—
  Géologie des Iles Wrangel et Herald: I. P. Tolmačev, 118 †
Herbertson, A. J., remarks on "Work of Research Department," 370; Thermal Regions of the Globe, 518 *
Herbertson, F. D., Clarendon Geography, 211 §; Elementary geography, vols. 5 and 6. Oxford Geographies, 583 †
Herderschee, F., Expedition to New Guinea, 336
Hergesell, H.: *see* Miethe, A.
Hermon, Mount, An ascent of: G. W. Lloyd, 456 †
Herrmann, A., Alte Verkehrsbeziehungen zwischen China und Vorderasien, 228 †
Herrmann, R., Theory on formation of Central Luzon Plain, 113 †
Hérubel, M. A., Sea Fisheries, 83 §
Herz, M., New Zealand, 78 §
Herzegovina—
  Études géomorphologiques sur l'Herzégovine: A. de Lacger, 111 †
Hess, F. L. and E., Bibliography of geology . . . of Tin, 672 †
Hess, H., Observations on glaciers, 284, 289, 293
Hessen—
  Anthropogeographie des Grossherzogtums Hessen, Beiträge zur: G. Greim, 341 †
Hettner, A., Klimate der Erde, 118 †
Hewison, J. K., Cambridge County Geographies. Dumfriesshire, 227 †
Hilber, V., Taltreppe, 225 †
Hildebrandsson, H. H. (*see also* Hellmann, G.), Quelques recherches sur les centres d'action de l'atmosphère, 347 †
Hildebrandt, A., Vergleich der Temperatur auf dem Brocken und in der gleichen Höhe der freien Atmosphäre, etc., 337 §, 582 †
Hilgard, E. W., A new development in Mississippi delta, 345 †
Hill, A. W., Visit to West Indies, 668 †
Himalayas—
  Exploration in Himalaya: V. D. Collins and B. T. Wyatt, 578 †
  Explorations in Himalaya by Mrs. Workman, 441
  Origin of Himalaya mountains: S. G. Burrard, 662 †
  Siachen or Rose Glacier, Some Notes on my 1912 expedition to: F. B. Workman, 615 *
  Trias of Himalayas: C. Diener, 343 †
Himilco, El periplo de: A. Blázquez, 121 †
Hindieh, Mesopotamia, Barrage at, 562
Hinks, A. R., Map projections, 670 †; Map Projections in actual use, 232 †;

remarks on "Work of Research Department," 370
Hirmata, Abyssinia, 375
Hirth, F., and W. W. Rockhill, Chau Jukua, 455 †
History—
Ancient History, School Atlas of: W. & A. K. Johnston, 351 †
Beginnings of History: E. M. McDougall, 329 †
Dawn of History: J. L. Myres, 80 §
Hjort, J.: *see* Murray, Sir J.
Hjuler, A., Languages spoken in Western Pamir, 663 †
Hobbs, W. H., Pleistocene Glaciation of North America, etc., 116 †
Ho Chou, China, 415
Hodgson, T. V., remarks on Antarctic Discovery at British Association, 549
Hodson, A. W., Trekking the Great Thirst, 75 §
Hoffmann, A., Carte Routière de la Hongroie, 350 †
Högbom, B., Wüstenerscheinungen auf Spitzbergen, 461 †
Hohokam, Ruins of, 264
Hokkaido, Coal-mining industry in, Report: H. Wrenaere, 562 §, 578 †
Holdich, Sir T. H., North-Eastern Frontier of India, 343 †; remarks at Anniversary Dinner, 100
Holland—
Anthropologie van Nederland, Onzekerheden en Vraagpunten betreffende de: J. Sasse, 226 †
Getijconstanten voor plaatten langs de kusten en bendenrivieren in Nederland: M. H. van Beresteyn, 452 †
Maps: Geschiedkundige Atlas van Nederland: A. A. Beekman, 584 †; Nederland met de Spoor-, Tram- en Scheepvaartwegen: E. De Geest, 122 †
Nederlands Landschappen, De Ontwikkeling van: W. L. Bouwmeester, 71 §
Trade and industry in Netherlands (Ministry of Agriculture, etc.), 660 †
Holzmann, M., Syrische Städtebilder, 456 †
Honduras, British—
Maps: British Honduras: E. Lassen, 124 †
Hongkong, Positions determined by C. Clementi on journey from Kashgar to, 624
Hooker, Sir J. D., 1817–1911 (Biography), 235 †
Hope river, Jamaica, 300
Hopkinson, E., Vocabulary of Mandingo language, 666 †
Hosseus, C. C., Hinterindische Eisenbahnfragen, 456 †
Hoste, Plan instantané de la Ville de Gand, 349 †
Hosten, H., List of Jesuit Missionaries in "Mogor" (1580–1803), 578 †
Howarth, O. J. R., Some Recent Census Returns, 60 *
Howchin, W., Australian glaciations, 460 †; Description of disturbed area of Cainozoic rocks in South Australia, 460 †
Howells, C. S., Transport facilities in Mining and Industrial Districts of South Wales and Monmouthshire, 632 §
Hrdlička, A., Natives of Kharga Oasis, Egypt, 579 †
Hubbard, G. D., Influence of presence . . . of precious metals in America on migration of people, 345 †
Huber, R., Empire Ottoman. Carte statisque des Cultes Chrétiens, 350 †
Hubert, H., Hydrography of Upper Volta Region, West Africa, 333
Hudson Bay—
Baie d'Hudson: L. A. Prud'homme, 580 †
Expedition in Hudson Bay Region by Mr. Tyrell, 88; 645
Hudson river—
Buried Channel of Lower Hudson: J. F. Kemp, 444
Hull, E., Monograph on sub-oceanic physiography of North Atlantic Ocean, 348 †
Hullbridge, On Correlation of Prehistoric "Floor" at: S. H. Warren, 227 †
Hume, W. F., Explanatory notes to accompany geological map of Egypt, 579 †; Geological expedition into Eastern Desert, 215 §, 579 †
Humphreys, R., Algiers, Sahara and Nile, 665 †
Humphreys, W. J., Height and temperature of isothermal region, etc, 233 †
Hungary—
Deutschen Sprache in Westungarn, Verbreitungsgebiet der: R. Pfaundler, 576 †
Deutsche Sprachgebiet in Südungarn: R. Pfaundler, 226 †
Maps: Carte Routière de la Hongroie: A. Hoffmann, 350 †
Hunt, H. A., Average rainfall map and isohyets of Western Australia, 586 †; Rainfall map of Australia, 1911..125 †
Hunting day-book, From my: Crown Prince of German Empire, 583 †
Huntington, E., Fluctuating Climate of North America, 264 *, 392 *; Geographical environment and Japanese national character, 343 †; Physical environment as a factor in present condition of Turkey, 454 †
Hunton, A. S., and V. G. Smith, Chart of Rangoon river, 239 †
Hurst, H. E., Flow of subsoil water, 461 †
Hutorowicz, H. de, Maps of Primitive Peoples, 120 †
Hutter, D., Liberia, 665 †
Hutton, E., Cities of Lombardy, 660 †
Hutton, J. A., Cotton growing in Anglo-Egyptian Sudan, 579 †

Hutton, S. K., Among Eskimos of Labrador, 116 †
Hwang-ho, Middle, First steamer on, 643
Hydrographical Surveys of Admiralty during 1911..317
Hydrology—
Flow of subsoil water: H. E. Hurst, 461 †
Meersalzgehalt des Brackwassers, Bestimmung von S.: M. Knudsen, 461 †
Hyslop, J. and R., Langholm as it was, 342 †

I.

Ibera—
Viaje de exploración à los esteros de Iberá, Memoria del: P. Uhart, 335 §, 459 †
Ibn Batuta—
Reise des Arabers Ibn Batuta durch Indien und China: H. von Mžik, 348 †
Ice—
Properties of ice: R. S. Tarr and J. I. Rich, 462 †
Viscosity of Ice: R. M. Deeley, 462 †
Icebergs—
Navigation, Icebergs and their location in: H. T. Barnes, 339 §, 462 †
Vicinity of Icebergs, Tests of, 568
Iceland—
Bodenbewegungen auf Island: H. Spethmann, 452 †
Island: W. von Knebel, 430 §
Population, Islande et sa: H. Stoll, 452 †
Volcanic phenomena, 431
Ida, Mount, the Troad, 36, 44
Idaho—
Boundary line between Idaho and Washington, Retracement of: R. B. Marshall, 667 †
Erosion surface in Idaho, An old: J. B. Umpleby, 345 †
Idemburg on East River, Dutch New Guinea, Survey by J. T. J. de Wal, 645
Inca—
Vitcos, the last Inca Capital: H. Bingham, 636 §
India—
Abor Expedition, Surveys of, 84
Black Mountain to Waziristan, From the: H. C. Wylly, 578 †, 632 §
Census, Indian: E. A. Gait, 342 †
Census Returns, 68
Cotton Growing Association, Correspondence re cotton growing in India, 578 †
Delta, Rivers of the: F. D. Ascoli, 343 †
English factories in India, 1637–1641: W. Foster, 343 †
Fauna, Indian, Protection of: Sir H. H. Johnston, 662 †
Flora of Upper Gangetic plain: J. F. Duthie, 662 †
Game Sanctuaries and Game Protection in India: E. P. Stebbing, 343 †
India—*continued.*
Hinterindische Eisenbahnfragen: C. C. Hosseus, 456 †
Jesuit Missionaries in "Mogor" (1580–1803), List of: H. Hosten, 578 †
Levelling of Precision in India: S. G. Burrard, 322 §
Maps: Maps published by Survey of India, 237 †, 466 †
Nordwestliche Grenzprovinz Indiens: A. Bencke, 662 †
North-Eastern Frontier of India: Sir T. H. Holdich, 343 †
North-West Frontier, Campaigns on: H. L. Nevill, 73 §
North-West Frontier of India, Sir M. A. Stein's Archæological Explorations on, 330
Omens and Superstitions of Southern India: E. Thurston, 112 †, 206 §
Railway, proposed, from Mediterranean to India: C. E. D. Black, 114 †
Scientific Advice, Annual Report of Board of, 1910–1911. 578 †
Scientific work in India, 1910–1911..440
Survey of India, Records of, 343 †
Water Supply of Hill Forts in Western India: F. J. Varley, 178 *
Indian Ocean—
Maps: Meteorological Charts (Met. Office, London), † 127, 239, 468, 587, 679; Meteorological Charts (U.S. Weather Bureau), † 127, 240, 352, 587, 680; Oceanographische en Meteorologische Waarnemingen in den Indischen Ocean 1856–1908 (Royal Netherlands Met. Inst.), 468 †; Pilot Charts (U.S. Hydrog. Office), † 127, 239, 468, 587, 680
Oceanographische . . . waarenemingen in den Indischen Ocean, 671 †
Percy Sladen Trust Expedition to Indian Ocean in 1908: J. S. Gardiner, 348 †
Indo-China—
Ruins of Indo-China, Forgotten: J. E. Conner, 577 †
Ingram, E. L., Geodetic surveying, 209 §
Inman, H. I., Rome, 342 †
Ionescu-Dobrogeanu, —, Scythia Minor, Berdjan, Dobrogia, Studiu istoricogeografic, 453 †
Ireland—
Gold and Bronze Age in Ireland, 194, 195
Handbook for travellers in Ireland: J. Murray, 577 †
Maps: Excelsior Railway map of Ireland: G. W. Bacon, 464 †
New Grange . . . and other incised tumuli in Ireland: G. Coffey, 577 †
Surface history of South-East Ireland, 560
Irtish river, Mongolia, 324
Ishii, Y., Explanatory text of Topographical and Geological Map of Formosa, 455 †

Ishikari coal-measures, 563
Isostasy—
Terra firma? What is, A review of current research in isostasy: B. Willis, 233 †
Theory of: H. Lewis, 233 †
Issel, A., Evoluzione della rive marine in Liguria, 452 †
Issyk Mountain Lake: A. Vinokurof, 441
Italy—
Altipiano dei Sette Comuni, Sull' idrografia carsica nell': L. de Marchi, 226 †
Laguna di Caleri, Sulla propagazione della marea nella, 453 †
Maps: Carte Corografica d'Italia (Ist. Geog. Militare), 237 †; Nuova Carta topografica del Regno d'Italia (Ist. Geog. Militare), 465 †
Pioggia nell' alta valle del Gorzente: G. Anfossi, 226 †
Plain-Towns of Italy: E. R. Williams, 205 §
Southern Italy and Sicily. Handbook for travellers: K. Baedeker, 342 †
Travel Sketches, Italian: J. Sully, 576 †
Wanderings on Italian Riviera: F. Lees, 576 †
Italy's War for a Desert: F. McCullagh, 230 †, 552 §

J.

Jackson, F. H., Rambles in Pyrenees and adjacent districts, 226 †, 432 §
Jackson, H. M., Federated Malay States. Report on Survey Dept. for 1910..112 †
Jackson, Sir J., remarks on "Garden of Eden and its restoration," 146
Jacob, C.: *see* Kilian, W.
Jägerskiöld, L. A., Om marina, glaciala relikter i nordiska insjöar, 453 †
Jamaica—
Earthquake of January 14, 1907, On cause of: V. Cornish, 299 *
James, O H., Lange's 'In the Amazon Jungle,' 635 §
Jamieson, G. S., and H. Bingham, Lake Perinacochas and composition of its water, 669 †
Janke, A., Dardanellen, 454 †
Jan Mayen—
Explorations by Dr. Charcot in Jan Mayen, 337
Jan Mayen expedition of 1911: W. S. C. Russell, 347 †
Photographs: Duchess of Bedford, 127 †
Japan—
Agriculture, Japanese, Influence of Geographical Conditions upon: E. C. Semple, 589 *
Asama-yama, Eruptions and earthquakes of: F. Omori, 85 §, 343 †
Coal-mining industry in Hokkaido, Report on, 562 §, 578 †
Japan—*continued.*
Geographical Environment and Japanese national character: E. Huntington, 343 †
Norikura Volcano: S. Kōzu, 455 †
Premier traité de France avec le Japon: H. Cordier, 578 †
Rice tillage in, 597, 598
Saijō Basin in Province of Aki: M. Nishimura, 343 †
Seiches of Lake Töya in Hokkaidō: N. Mori, 455 †
Sericulture in, 600
Underground Temperature in Japan: S. Kawamura, 455 †
Usu-san, New mountain of Year 1910: E. B. Bailey, 662 †
Japanese Antarctic Expedition, 220
Jarilla mountains, Arizona, 279
Jeffery, H. J.: *see* Bevis, J. F.
Jemez forest, United States, 403
Jerome, A., and L. Greindl, Notes sur le modelé et réseau hydrographique des terrains secondaires du Luxembourg, 452 †
Jerphanion, P. G. de, Ibora-Gazioura? Etude de géographie pontique, 112 †
Jersey—
Pleistocene Man in Jersey: R. R. Marett, 111 †
Jerusalem—
Jerusalem: Sir C. M. Watson, 329 §
Jochelson, W., Work of Expedition to Aleutian Islands and Kamtchatka, 318
Johns, C. H., Ancient Assyria, 112 †, 439 §
Johnson, D. W., Beach-cusps, 233 †; Fixité de côte atlantique de l'Amérique du Nord, 335 §, 667 †; Practical exercises in Map Drawing, 236 †
Johnson, F. E., Sacred City of Sands, 458 †
Johnson, W., Byways in British Archæology, 71 §
Johnson, W. W., Hanging Valleys of Yosemite, 345 †
Johnston, Sir H. H., Portuguese Colonies, 463; Protection of Indian Fauna, 662 †; Views and reviews from outlook of an anthropologist, 236 †
Johnston, W. & A. K., School Atlas of Ancient History, 351 †
Joubin, L., La vie dans les océans, 348 †; Sur une carte des récifs de coraux, 670 †
Joyce, T. A., South American Archæology, 232 †, 435 §
Juan Fernandez—
Geology der Juan Fernandezinseln: P. D. Quensel, 346 †
Junod, H. A., Life of a South African tribe, 579 †
Jura—
Jura méridional: J. B. Martin, 111 †, 320 §
Juraschek, F. von, Otto Hübners Geographisch-statistische Tabellen aller Länder der Erde, 349 †
Justice, O., Nouvelle route des Alpes, 576 †

K.

Kafirkot, Ruins of, North-West India, 330
Kai Province, Japan, silk culture in, 601
Kairwan—
Sacred City of Sands: F. E. Johnson, 458 †
Kaiserin Augusta river, New Guinea, German expedition to, 220
Kalahari—
Trekking the Great Thirst: A. W. Hodson, 75 §
Kamchatka—
Expedition to: W. Jochelson, 318
Flora of Kamchatka: V. Komarof, 562
Waters of Kamchatka, Report on investigation of: V. N. Lebedef, 113 †
Kamerun—
Astronomische Ortsbestimmungen in Kamerun: v. der Leyden, 115 †
Boundary-line, Survey of, 644
Chemin de fer franco-allemand du Kamerun à l'Ubangi, Projet de: A.- J. Wauters, 115 †
Lakes of Kamerun: K. Hassert, 216
Manenguba-Hochland: F. Thorbecke, 115 †
Maps: Karte von Kamerun: M. Moisel, 123 †, 466 †
Mission Cottes au Sud-Cameroun (1905–1908): A. Cottes, 434 §
Kames—
Relations of Kames and Eskers: J. W. Gregory, 169 *
Kamet peak, Himalaya, 258
Kamrat, Kohistan, 53
Kan, C. M., Handleiding bij de beoefening der economische aardrijkskunde, 234 †
Kangchenjhau mountain, Himalaya, 254
Kangchenjunga mountain, 242
Karakara tribe, Uganda, 490, 491
Karakoram—
Scientific Expedition, Proposed, to Karakoram: F. de Filippi, 559
Kark, I., Notes on Valley of Murgab, 113 †
Karun river, 142
Kasai—
Géologie du Bassin du Kasai, Notes sur: J. Cornet, 114 †
Kashgar to Hongkong, Positions determined by C. Clementi on journey from, 624
Kasim, Mohammad, Meteorological expedition to Siwa, 579 †
Katanga—
Histoire du Katanga: G. Gardet, 229 †
Katz, F. J.: *see* Martin, G. C.
Kawamura, S., On underground temperature in Japan, 455 †
Keen, D., First Expedition to Mount Blackburn, Alaska, 217 §, 666 †; Mountain climbing in Alaska, 458 †
Kellas, A. M., letter from, on Mountain Sickness, 654; Mountains of Northern Sikkim and Garhwal, 241 *
Kelly, H. H., Pibor river II. Beir Country, 497 *
Keltie, J. S., Statesman's Year-book, 1912..329 §
Kemp, J. F., Buried Channel of Lower Hudson, 444
Kengen river, Sudan, 498
Kennedy, N., Surveying with tacheometer, 232 †
Kerkha river, Mesopotamia, 142
Kermack, W. R., Geographical factor in Scottish Independence, 111 †; Making of Scotland, 661 †
Kerr, R., Morocco after Twenty-five Years, 325 §
Kettle, D. W., obituary, 574
Key West and Cuba, 345 †
Kharga Oasis, Egypt, Natives of: A Hrdlička, 579 †
Kidson, E., Atmospheric electricity observations on second cruise of *Carnegie* from New York to Columbo, 233 †
Kiepert, H., Generalkarte der Südost Europäischen Halbinsel, 673 †
Kiepert, R., Formæ Orb's Antiqui, 586 †; Karte von Kleinasien, 585 †, 675 †
Kilian, W., and C. Jacob, Sur le nonparallélisme des Zones isopiques, etc., 225 †; Sur la tectonique des montagnes situées entre la Mont Blanc et petit Saint-Bernard, 225 †
Kilimanjaro—
Mawenzi Peak, Ascent by E. Oehler and F. Klute, 563
King, L. V., On the limiting strength of rocks under conditions of stress existing in the Earth's interior, 461 †
King, L. W., remarks on "Garden of Eden and its Restoration," 147
King, Sir G., and J. S. Gamble, Flora of Malay Peninsula, 662 †
Kipling, R., remarks at Anniversary Dinner, 108
Kisale, Lake—
Problème du lac Kisale: Capt. Mauritzen, 456 †
Kisii highlands north-east of Victoria Nyanza: F. Oswald, 539
Kislovodsk, Climate of: A. Voeikof, 113 †
Kitson, A. E., remarks on "Some New Zealand Volcanoes," 24
Klemm, G., Führer bei geologischen Exkursionen im Odenwald, 576 †
Klotz, O., Earthquake epicenters, 671 †; Quebec, Magnetic Declination observed in 1909 (Maps), 676 †
Klute, F., Ascent of Mount Mawenzi, Kilimanjaro, 563
Knebel, W. von, Island, 430 §
Knoch, K. (*see also* Schmidt, J. J.), Beitrag zur Kenntnis der Temperatur- und Feuchtigkeitsverhältnisse in Verschiedener Höhe über dem Erdboden, 119 †
Knoche, W., Observaciones en la Mina Aguila, 346 †
Knope, A., Sitka mining district, Alaska, 458 †

Knox, A., obituary, 222
Knox, G. S., Survey Department of British East Africa. Annual Report, 114 †, 456 †
Knudsen, M., Ueber Bestimmung von S' meersalzgehalt des Brackwassers, 461 †
Kober, R., Schulhandkarte des Herzogtums Schlesien, 464 †
Koch, J. P., Danmark-Ekspeditionens Kort, 347 †; Trans-Greenland Expeditions, 566; und A. Wegner, Glaciologischen Beobachtungen der Danmark—Expedition, 554 §
Kock, M. A., Eenige ethnologische en anthropologische gegevens omtrent een dwergstam in het bergland van Zuid Nieuw-Guinea, 346 †
Kohistan villages, 49
Kolchak, A., Glaces de mer de Kara et de mer de Sibéria, 581 †
Komarof, V., Flora of Kamchatka, 562
Komorowicz, M. V., Vulkanologische Studien auf einigen Inseln des Atlantischen Oceans 348 †
Kordofan—
  Tribes of: H. A. MacMichael, 664 †
Korea—
  Flora Koreana: T. Nakai, 662 †
Kossinna, G., Deutsche Vorgeschichte, 341 †
Kotsuke, silk district, Japan, 601
Kōzu, S., Norikura Volcano, 455 †
Kraentzel, F., Géographie en Allemagne et en Autriche, 349 †
Kruppa, E., Ueber einige Orientierungsprobleme der Photogrammetrie, 670 †
Kruuse, C., Travels and Botanical Investigations in East Greenland, 670 †
Kuchinka, G., Königreich Polen als strategisches Terrain, 227 †
Kuznetsof, N. I., Highlands of Dagestan . . . and distribution of flora of Caucasus, 113 †

L.

Labrador—
  Animal sanctuaries in Labrador: W. Wood, 667 †
  Cartwright, Captain, and his Labrador Journal: C. W. Townsend, 76 §
  Eskimos of Labrador, Among the: S. K. Hutton, 116 †
  Expedition into interior of Labrador: H. G. Bryant, 565
  Gulf Stream influence on coasts of Labrador, 95
  Northern Labrador, In: W. B. Cabot, 580 †
  Photographs: H. Reeve, 240 †
Labrang Monastery, North-West China, A Visit to: G. Pereira, 415 *
Lacger, A. de, Études géomorphologiques sur l'Herzégovine, 111 †
Lacoste, B. de, Au pays sacré des anciens Turcs et des Mongols, 112 †
Lacroix, A., Volcan de Réunion, 230 †; Volcans du centre de Madagascar, 457 †
Ladreit de Lacharrière, J., Dans le sud et l'ouest du Maroc, 665 †
Lafit range, Uganda, 488
La Flesche, F.: *see* Fletcher, A. C.
Lafon, Jebel, Sudan, 487
Lagos—
  Twenty-three years in Lagos and Gambia: Sir G. Denton, 230 †
Lakes—
  Topographie . . . der aussereuropäischen Seen: W. Halbfass, 582 †
  Wirkung der grossen Hitze- und Dürrezeit 1911 auf die Seenverdunstung: J. Maurer und J. Früh, 119 †
Laling fort, West India, Rock cistern, 181
Lame, —, and J. Ferrandi, Fort Lamy, chief-lieu du territoire du Tchad, 344 †
Lamplugh, G. W., On Shelly Moraine of Sefström glacier, etc., 118 †; and others, Geology of country round Ollerton, 454 †
Lamy, Fort—
  Fort Lamy, chef-lieu du territoire du Tchad: Capt. Lame et J. Ferrandi, 344 †
Lancashire—
  Cambridge County Geographies, North Lancashire: J. E. Marr, 342 †
  Lancashire region: T. W. F. Parkinson, 111 †
Land—
  Land and water areas on Earth's surface, Measurement of: H. Wagner, 568
  Land und Wasser auf der Erdoberfläche: E. Hammer, 462 †
Land-forms: *see* Geomorphology
Lands and their peoples: J. W. Page, 236 †
Lange, A., In the Amazon jungle, 232 †, 635 §
Langenburg—
  Landeserkundung im Bezirk Langenburg: — V. Trotha, 664 †
Langholm as it was: J. and R. Hyslop, 342 †
Lango tribe, Central Africa, 433
Langpo peak, Himalaya, 248
Langres, Plateau de: H. Masson, 341 †
Languages—
  Orthography for Unwritten Languages, 92; letter from J. C. C. Coxhead on, 655
Lannoy, C. de, and H. van der Linden, Histoire de l'Expansion Coloniale des Peuples Européens de la Néerlande et du Danemark, 438 †
Lapicque, P.-A., Canal de Sseu-ngen, 662 †
Lapland—
  Photographs of Swedish Lapland: B. Mesch, 588 †
Larpent, G. de H., Development and progress of Rhodesia, 665 †
Lassen, E., Map of British Honduras, 124 †
Laterite—
  Lateritbildung und Tropen-Klima: P. Vageler, 671 †
Latham, H., Au Sidamo et chez les Gallas Aroussi, 663 †

La Touche, T. H., Geology of Lonar Lake, 84 §, 342 †
Launceston—
Geology of country round Tavistock and Launceston: C. L. Reid and others, 454 †
Lawson, A. C., On some post-glacial faults near Banning, Ontario, 580 †
Lea, River—
Valley of River Lea, On late glacial stage in: S. H. Warren, 660 †
Leaf, W., Notes on the Troad, 25 *; Troy: a study in Homeric geography, 578 †
Leary, L. G., Andorra, the hidden republic, 660 †
Lebedef, V. N., report on investigation of waters of Kamchatka, 113 †
Leclercq, J., Colonisation chez les Hollandais, 235 †; Voyage à l'Ile Majorque, 72 §
Leech, Sir B. T., Panama Canal, 346 †
Lees, F., Wanderings on Italian Riviera, 576 †
Leffingwell, E. de K., Researches in Arctic North America, 565
Le Gallois, A., Contribution à la cartographie du Congo français, 344 †
Legendre, A., Récente exploration du Dr. Legendre, 228 †
Legendre, R., Pêche chez les peuples primitifs, 234 †
Legg, W. A., Irrigation in South Africa, 230 †
Lehmann, B.: *see* Tacke, B.
Leith, C. K.: *see* Van Hise, C. R.
Lemoine, P., Géologie du Bassin de Paris, 70 §
Lena river, Russian Survey of, 220
Lepszy, L., Cracow, Royal Capital of Ancient Poland, 321 §
Leslie, J. H., History of Landguard Fort, in Suffolk, 454 †
Lessini mountains—
Formes singulières d'érosion dans brecciolos basaltiques des monts Lessini: R. Fabiani, 452 †
Le Strange, G., Description of province of Fars, in Persia, 229 †
Lewis, H., Theory of Isostasy, 233 †
Leyden, — v. der. and — Schmauder. Astronomische Ortsbestimmungen in Kamerun, 115 †
Liberia—
Boundaries of, 644
Frontière Franco-Libérienne: L. Peyrissac, 230 †
Liberia: D. Hutter, 665 †
Libyan Desert, Investigations in, 86
Liffey Valley, Problem of: G. A. J. Cole, 560 §
Light—
Studie über Licht und Luft des Hochgebirges: P. C. Dorno, 80 §
Liguria—
Evoluzione delle rive marine in Liguria: A. Issel, 452 †
Lima, R., Alguns trechos do relatorio do, sobre a sua missao ás Minas de Cassinga em 1898..579 †
Lindsay, F., Panama and Canal to-day, 668 †
Lioson, Lac: H. Dittenbergen, 659 †
Lister, A., A monograph of Mycetozoa, 348 †
Lisu tribes on Burma-China frontier: A. Rose and J. C. Brown, 342 †
Livingstone Centenary, 1913, Programme for, 650
Lloyd, G. W., An ascent of Mount Hermon, 456 †
Locci, P., Provincia di Perugia, 453 †
Lodot, Khor, Sudan, 487
Loess—
Origin of Loess, On question of: V. A. Obrucheff, 233 †
Lohit Brahmaputra, photographs of: N. Williamson, 680 †
Loisel, J., Sur distribution de chaleur solaire à la surface de la France, 111 †
Lombardy—
Cities of: E. Hutton, 660 †
Lonar Lake, Geology of: T. H. La Touche, 84 §, 342 †
Lonar soda deposit: W. A. K. Christie, 342 †
London—
London and its environs. Handbook for travellers: K. Baedeker, 342 †
Making of London: Sir L. Gomme, 321 §
Maps: Environs of London: G. W. Bacon, 464 †; Map of London: A. Gross, 674 †
Long range, Newfoundland, 88
Longmans' Geographical Series. The World, 211 §
Longstaff, T. G., Mountain sickness and its probable causes, 234 †
Lönnberg, E., Svenska zoologiska expeditionen till Ostafrika, 1910–1911..344 †
Loppens, K., Origine des Couleurs des Eaux, 462 †
Lossiemouth, Account of Measurement of Geodetic Base Line at (Board of Agriculture and Fisheries), 555 §, 661 †
Lotilla River, Sudan, 498
Louderback, G. D., Pseudostratification in Santa Barbara County, California, 667 †
Loutouguine, L., Carte géologique détaillée du bassin du Donetz, 675 †
Lowe, W., Tropics and Pigment, 672 †
Lozinski, W. v., Periglaziale Fazies der mechanischen Verwitterung, 119 †
Lucas, E. V., Wanderer in Florence, 660 †
Lucca, Story of: J. Ross and N. Erichsen, 660 †
Lucerna, D. R., Trogfrage, 119 †
Lugano, Lake—
Tiefenfauna des Luganer Sees: J. W. Fehlmann, 659 †
Lugard, Sir F., remarks on "Northern Nigeria," 164
Lukis, C. P., and R. J. Blackham, Tropical Hygiene, 329 §
Lull, R. S., Glacial man, 348 †

Lumholtz, C., Sonora Desert, Mexico, 503 *
Lunz Lakes—
Lunzer Seen: G. Götzinger, 225 †
Lushei Kuki Clans: J. Shakespear, 578 †
Lütgens, R., Verdunstung auf dem Meere, 91 §. 119 †
Luxemburg—
Modelé et réseau hydrographique des terrains secondaires du Luxembourg, Notes sur: A. Jerome et L. Greindl, 452 †
Luzon—
Formation of Central Luzon Plain, Theory on: R. Herrmann, 113 †
Geologic reconnaissance of Southeastern Luzon: G. I. Adams and W. E. Pratt, 442 §, 455 †
Lyde, L. W., remarks: "Influence of Geographical Conditions upon Japanese Agriculture," 605; "The Tyne," 483; "Work of Research Department," 370
Lyell, D. D., Nyasaland for Hunter and Settler, 326 §
Lyne, R. N., Climate of Mozambique, 457 †
Lyons, H. G., remarks on "Thermal Regions of the Globe," 529; remarks on "Work of Research Department," 369; Sir W. Willcocks's survey in Mesopotamia, 501 *

M.

Macalister, R. A. S., History of civilization in Palestine, 229 †, 439 §; and others, Report on exploration of bronze-age carns on Carrowkeel Mountain, Co. Sligo, 227 †
McCourt, W. E., Philosophy of geography, 463 †
McCrae, G. G., Ancient buried vessel at Warrnambool, 460 †; Historical Sketch of life of late Captain Flinders, 235 †
McCullagh, F., Italy's War for a Desert, 230 †, 552 §
MacDougal, D. T., remarks on "Thermal Regions of the Globe," 530; Water relations of Desert Plants, 120 †; and G. Sykes, Investigations in Egyptian Deserts, 86
McDougall, E. M., Beginnings of History, 329 §
MacFarlane, C. T., Erie Canal, 459 †
Macfarlane, J. J., Commerce of World, 1910 . . . 234 †; Industrial Philadelphia, 668 †
Macfie, W. C., remarks on receiving R.G.S. Award, 98
Macgowan, J., Men and manners of modern China, 577 †
Machaček, F., Ueber Ursachen und Einteilung einiger Massenbewegungen, 671 †; Vorläufige Mitteilungen über die Ergebnisse einer Studienreise in den westlichsten Tian-schan, 663 †
McInnes, W., Report on part of North-West Territories of Canada, 580 †
Mackellar, C. B., Scented Islands and Coral Gardens, 79 §
McKinley, Mount., Attempted ascent by Prof. Parker, 566; letter from O. Beauclerk on, 656; Earthquake on Mount McKinley, 656
Maclaren, M., Desert Water-holes in Western Australia, 219, 669 †
MacMichael, H. A., Tribes of Northern and Central Kordofan, 664 †
M'Michael, T., Geographical Basis of Nationality, 121 †
Macnair, P., Cambridge County Geographies. Perthshire, 227 †; Recent floods in Perthshire, 661 †
Macquarie island, Wireless Station at, 567
MacRitchie, D., Eskimos of Davis Straits in 1656..460 †
Madagascar—
Observations Météorologiques faites à Tananarive: E. Colin, 457 †
Volcans du centre de Madagascar: A. Lacroix, 457 †
Madü-see—
Gibt es im Madüsee Temperaturseiches? W. Halbfass, 576 †
Maheu, J., Exploration et flore souterraine des cavernes de Catalogne et des îles Baléares, 576 †
Maistre, P., Cuba. Étude de géographie économique, 459 †
Majorca—
Voyage à l'Ile Majorque: J Leclercq, 72 §
Malay Archipelago—
Maps: Schetskaart van het Eiland Wetar, Eiland Adonara (Top. Bureau, Batavia), 237 †
Malay Peninsula—
Flora of: Sir G. King and J. S. Gamble, 662 †
Malay States—
Federated Malay states. Report on Survey Dept. for 1910: H. M. Jackson, 112 †
Maligne Lake—
Survey by Mrs. Schäffer: J. White, 334
Malta—
Mediterranean race, Malta and: R. N. Bradley, 660 †
Man—
Glacial Man: R. S. Lull, 348 †
Man and his conquest of Nature: M. I. Newbigin, 234 †, 557 §
Man and the Earth: J. W. Page, 582 †
Manchester—
Maps: Plan of Manchester: A. Gross, 674 †
Manchuria—
Climatic and Economic Conditions of Northern Manchuria: R. T. Turley, 57 *
Japanese in Manchuria, 1904: E. L. Cordonnier, 112 †, 325 §
Plague in Manchuria: R. Farrar, 577 †

Manders, M. S.: *see* Torrey, W. T.
Mangyshlak district, Report on geological investigations in steppes of: M. V. Bayarunass, 113 †
Manitoba—
Extension of territory, 87
Maps: Indexed county map: Rand McNally, 35 †; Manitoba (Dept. of Interior), 467 †
Maps (*see also* Cartography)—
Descriptive catalogues of maps: Sir H. G. Fordham, 235 †
International Map of World: Sir C. M. Watson, 427; letter from C. F. Close on, 655
Linienmessung auf Karten: F. E. Mouths, 461 †
Maps: how they are made, how to read them: H. N. Dickson, 347 †, 438 §
Primitive Peoples, Maps of: H. de Hutorowicz, 120 †
Ptolemy's Maps, Manuscript Succession of: J. Fischer, 649
Maps, New—
Africa, 122, 238, 350, 466, 585, 675
America, 124, 351, 467, 585, 676
Asia, 122, 237, 350, 465, 584, 675
Australasia and Pacific Islands, 125, 467, 586
Europe, 121, 236, 349, 464, 583, 673
General, 125, 238, 351, 467, 586, 677
Polar Regions, 677
Marchi, L. de, Sull' idrografia carsica nell' Altipiano dei Sette Comuni, 226 †
Marconi's Wireless Telegraph Co.'s Wireless Map of World, 351 †
Marek, R., Zur Anthropogeographie des Waldes, 672 †
Marett, R. R., Pleistocene Man in Jersey, 111 †
Markham, Sir C., Book of knowledge of all kingdoms, lands, and lordships that are in the world, etc.: M. J. de la Espada, 120 †, 640 §; Present Position of Antarctic Discovery, 541 *; retirement from Council of R.G.S., remarks by Lord Curzon, 109
Marlborough Country: H. C. Brentnall and C. C. Carter, 112 †, 557 §
Marr, J. E., North Lancashire, Cambridge County Geographies, 342 †
Marriott, W. (*see also* Fowler, J. S.), remarks on "Thermal Regions of the Globe," 531
Marshall, E., remarks on Antarctic Discovery at British Association, 548
Marshall, R. B., Results of spirit levelling in Colorado, etc., 117 †
Marson, L., Sui ghiacciai dell' Adamello-Presanella, 111 †
Marstrander, R., Svartisen: dens geologi, 227 †
Martel, E.-A., Sur profil en long et l'alluvionnement du cañon du Rhône, 111 †
Marten, G. M., Influence of environment on peoples of Arabia and Syria, 661 †
Martin, G. C., and F. J. Katz, Geologic reconnaissance of Iliamna Region, Alaska, 666 †
Martin, J.-B., Jura méridional, 111 †, 320 §
Martin, L., Gletscheruntersuchungen langs der Küste von Alaska, 666 †; Progressive development of resources in Lake Superior Region, 117 †
Martin, M., Au cœur de l'Afrique Equatoriale, 579 †
Martzoeff, C. L., Robinson Crusoe: A study in the new geography, 463 †
Mason, J. A., Study of Tepecano or Tepehuán people, 318
Masson, H., Plateau de Langres, 341 †
Mathuisieulx, H. M. de, Tripolitaine d'hier et de demain, 552 §
Maunsell, F. R., remarks on "Garden of Eden and its Restoration," 147
Maurer, J., Verdunstung auf den Seen am Nordfuss der Alpen während der grossen Hitze- und Dürrezeit 1911.. 454 †; und J. Früh, Die Wirkung der grossen Hitze- und Dürrezeit 1911 auf die Seenverdunstung, 119 †
Mauritania—
Carte de Mauritanie, Contribution à la: R. Chudeau, 115 †
Ressources agricoles de la Mauritanie: R. Chudeau, 665 †
Mauritius—
Rain in Mauritius during 1891–1900, Distribution of: V. Raulin, 230 †
Mauritzen, —, Problème du lac Kisale, 456 †
Maury, M. J., Description de la frontière orientale du Congo belge, 229 †; Régions voisines de la frontière orientale du Congo Belge du Tanganyka au lac Albert, 344 †
Mawenzi peak, Kilimanjaro, Ascent by E. Oehler and F. Klute, 563
Mawson, D., Antarctic Expedition, 447, 567; Antarctic Expedition and supposed position of "Termination Land," 91
May, W., Gomera; die Waldinsel der Kanaren, 343 †
Mayor island, New Zealand, 22
Mazzolani, D., In ferrovia da Junnansen a Lao-cai, 228 †
Mecca—
Modern Pilgrim in Mecca and a siege in Lanaa: A. J. B. Wavell, 661 †
Mecklenburg, Duke of, über seine "Inner-Afrika-Expedition," 230 †
Mediterranean—
Acclimation du Saumon dans le Bassin de la Méditerranée: L. Fage, 462 †
Coasts of, 295
Maps: Bacon's Excelsior map of Mediterranean Lands, 675 †
Strategischen Passagen und Engen des Mittelmeers: P. Rohrbach, 453 †

Meinardus, W., Beobachtungen über Detritussortierung..auf Spitzbergen, 461†; Ueber einige charakteristische Bodenformen auf Spitzbergen, 670†
Meinhard, F., Persische Ueberlandbahnen, 112†
Meissner, A., Talgeschichte der Stillen Adler in Ostböhmen, 659†
Melanesia—
Reisewege und Aufenthalte in Melanesien: O. Schlaginhaufen, 117†
Melland, F. H., and E. H. Cholmeley, Through Heart of Africa, 433§, 664§
Mendioroz, L., Atlas de Centro-America, 676†
Meniaud, J., Haut-Sénégal-Niger. Géographie économique, 664†
Mercier, E., Pays du Logone-Chari, 579†; Voie de la Bénoué, 230†
Merk, C., Normandy Coast, 72§
Merkulof, V. A., Guide to mountains of Caucasus, 73§, 455†
Merz, A., Hydrographischen Verhältnisse der Nord- und Ostsee, 671†
Merzbacher, G., Erdbeben in Russisch Turkestan, 113†
Mesa Verde, Geographic study of: W. W. Atwood, 667†
Meech, B., Photographs of Swedish Lapland, 588†
Mesellata, Tripoli, 534
Mesopotamia—
Irrigation Works, completion of first instalment, 561
Photographs of Lower Mesopotamia: Sir W. Willcocks, 680†
Survey in Mesopotamia, Sir W. Willcocks's: H. G. Lyons, 501*
To Mesopotamia and Kurdistan in disguise: E. B. Soane, 663†
Verdens ældste Kulturland: J. Ostrup, 113†
Meteorology—
Circulations Atmosphériques, Contribution à l'Etude des Relations existant entre les: A. Vialay, 437§
Internationaler Meteorologischer Kodex: G. Hellmann und H. H. Hildebrandsson, 233†
Meteorological interest of a voyage to Brazil: R. De C. Ward, 119†
Our weather: J. S. Fowler and W. Marriott, 436§
Temperatur, Vergleich der, auf dem Brocken und in der gleichen Höhe der freien Atmosphäre: A. Hildebrandt, 337§, 582†
Mexico—
Ancient temples and cities of New World—Xochicalco: F. B. Purdie, 667†
Drake documents in Archives of Mexico discovered by Mrs. Nuttall, 621
Maps: Carta de Republica Mexicana, 467†
Sonora Desert: I. N. Dracopoli, 511*; C. Lumholtz, 503*
Meyer, H., Auf neuen Wegen durch Ruanda und Urundi, 456†
Meyer, H., Kimmtiefenbeobachtungen, 462†
Michelin, —, France (map), 122†, 465†
Miethe, A., Ueber Karreeboden auf Spitzbergen, 461†; und H. Hergesell, Mit Zeppelin nach Spitzbergen, 79§
Mikkelsen, E., Expedition in Greenland, 337
Mikula, D. H., Hebung der Atmosphärischen Isothermen in den Ostalpen, 659†
Mill, H. R., Modern Oceanography, 411*
Miller, E. R, Local climatic peculiarities in their relation to intensive agriculture, 234†
Milne, J., Catalogue of Destructive Earthquakes, 462†
Mindanao—
Geologic reconnaissance of island of Mindanao and Sulu Archipelago: W. W. Smith, 663†
Greatest ocean depth east of, 447
Mishmi Mission: A. Hamilton, 343†
Misrata, Tripoli, 534
Mississippi—
New development in Mississippi delta: E. W. Hilgard, 345†
Quarternary lakes in Mississippi basin: New system of: E. W. Shaw, 117†
Missuna, A., Materialen zur Geologie des Gouvernements Grodno, 453†
Mitford, E. L. O., obituary, 652
Moffit, F. H., and S. R. Capps, Geology and mineral resources of Nizina district, Alaska, 458†
Moisel, M., Karte von Kamerun, 123†, 466†
Monaco, Prince of, Fortschritte der Ozeanographie, 582†; Progresos de la Oceanografía, 582†
Mongolia—
Découvertes du Prof. Sapojnikoff dans l'Altai de Mongolie, 662†
Eastern Mongolia, Agricultural possibilities of, 58
Pays sacré des anciens Turcs et des Mongols: B. de Lacoste, 112†
Photographs: G. C. Binsteed, 128†
Monico, A., Città di Nagasaki, 455†
Montagnier, H. F., Paccard's lost narrative, 225†
Montandon, G., A journey in South-Western Abyssinia, 372*; Western Abyssinia, 372*; Traversée du massif Ethiopien, etc., 663†
Moore, Sir N. J., A British State in the making, 118†
Moore-Robinson, J., A record of Tasmanian Nomenclature, 460†
Mordziol, C., Geologischer Führer durch das Mainzer Tertiärbecken, 576†
Morel, E. D., Morocco in diplomacy, 325§

Morgan, P. G., Geology of Greymouth Subdivision, North Westland, 460 †
Mori, N., On seiches of Lake Toya in Hokkaidō, 455 †
Morocco—
Accords franco-allemands et négociations Marocaines: A. Terrier, 114 †
Deuxième, voyage in Maroc: H. Bardon, 665 †
Diplomacy, Morocco in: E. D. Morel, 325 §
Maps: Carte du Maroc: A. Cuénot, 123 †; Maroc au 1: 100,000 (Service Géo. de l'Armée), 123 †
Maroc physique: L. Gentil, 344 †
Marokkos Eisenerze in ihrer wirtschaftlichen Beziehung zu Deutschland: G. Goldberg, 230 †
Massif montagneux des Beni Snassen et ses abords: — Boigey, 457 †
Morocco after twenty-five years: R. Kerr, 325 §
Photographs: A. J. Douglas, 128 †
Populations du Maroc: Marquis de Segonzac, 665 †
Sud et l'ouest du Maroc, Dans le: J. Ladreit de Lacharrière, 665 †
Tectonique du Haut Atlas Marocain: L. Gentil, 457 †
Treaties, etc., 1904–1911 .. 457 †
Morrey, W. T.: *see* Arey, A. L.
Mort, F., Renfrewshire. Cambridge County Geographies, 227 †
Morteratsch Glacier, In and around the: J. Y. Buchanan, 454 †
Mosskowski, M., Expedition zur Erforschung des Mamberamo in Hollandisch Neu-Guinea, 669 †
Moubray, J. M., In South Central Africa, 230 †
Moulaert, M., Voies de communication et de transport au Congo Belge, 229 †
Mountain sickness—
Cause of, letters from W. H. Shockley and A. M. Kellas, 653, 654
Factors of, 258, 259
Probable causes, Mountain Sickness and its: T. G. Longstaff, 234 †
Mouths, F. E., Linienmessung auf Karten, 461 †
Mozambique—
Climate of Mozambique. A study in Rainfall: R. N. Lyne, 457 †
Mubi expedition: — Schwartz, 665 †
Muir, T. S., Position of geography in Scottish schools, 541
Mulder, M. E., Explosion von Meteoren und der Meteorkrater von Canyon Diablo in Arizona, 345 †
Müller, B., Entstehung der Seebecken im Gebiete des oberen Polenztales in Nordböhmen, 225 †
Müller, —, Erkundungsritt in das Kaukau-Veld, 665 †
Muller & Co., F., Oud-Amsterdam, 452 †
Muller, R., Vegetationsbilder aus dem Schwarzwald, 226 †
Mumm, A. L., Photographs of Canadian Rockies, 127 †; remarks on "Mountains of Northern Sikkim and Garhwal," 262
Munro, R., Palæolithic man and Terramara settlements in Europe, 660 †
Munthe, H., Hufvuddragen af Gotlands fysiskit-geografiska utveckling efter istiden, 453 †
Murgab, Notes on Valley of: I. Kark, 113 †
Murman Coast—
Wissenschaftlich-praktische Murman-Expedition: L. L. Breitfuss, 227 †
Murray, G. D., Quena-Qoseir Road, 456 †
Murray, Sir J., and J. Hjort, Depths of Ocean, 233 †, 413 §
Musil, Prof., explorations in Arabia, 643
Mweru, Lake—
Anciennes populations le long de la bordure occidentale du lac Moëro, A propos des traces laissés par: M. Robert, 456 †
Mycetozoa, A monograph of: A. Lister, 348 †
Myres, J. L., Dawn of History, 80 §; Work of Research Department, 356 *
Mžik, H. von, Reise des Arabers Ibn Batuta durch Indien und China, 348 †

N.

Nabal, Mount, and Lake, Kohistan, 55
Nagasaki—
Città di Nagasaki: A. Monico, 455 †
Nahrwân, Ruin of, 141
Nahuel Huapi, Lago, Patagonia, 613
Nakai, T., Flora Koreana, 662 †
Nakcun, Ruines de: Comte M. de Périgny, 667 †
Nalut, Tripoli, 533
Nansen, F., Entdeckung Amerikas durch die Nordmänner, 116 †; Magnetische Abweichung im Anfang des 16. Jahrhunderts, 234 †; Race for South Pole, 461 †
Natal—
Vegetation of Natal: J. W. Bews, 665 †
Nationality, Geographical Basis of: T. M'Michael, 121 †
Natural bridges—
Durchlöcherte Berge und orographische Fenster: S. Günther, 119 †
Nelson, H., Om Kulturgeografien i skolan, 235 †
Nerlerrim tribe, Uganda, 488
Netherlands: *see* Holland
Neuhauss, R., Deutsch Neu-Guinea, 669 †
Nevill, H. L., Campaigns on North-West Frontier, 73 §
Newbigin, M. I., An introduction to physical geography, 582 †; Man and his conquest of Nature, 234 †, 557 §
Newcastle-on-Tyne—
Early significance of, 472, 473
Newcombe, L., Catalogue of periodical publications . . . in library of University College, London, 583 †

Newell, F. H., Progress in reclamation of arid lands in Western United States, 231 †
Newfoundland—
Photographs: H. Reeve, 240 †
Physiography of Newfoundland: W. H. Twenhofel, 88 §, 116, †
New Guinea, British: *see* Papua
New Guinea, Dutch—
Ethnologische en anthropologische gegevens omtrent een dwergstam in het bergland van Zuid Nieuw-Guinea: M. A. Kock, 346 †
Expedition under F. Herderschee, 336
Exploratie van Nieuw-Guinea: J. J. Staal, 346 †
Explorations, Recent, 645
Mamberamo in Hollandisch Neu-Guinea, Expedition zur Erforschung des: M. Mosskowski, 669 †
Noord Nieuw-Guinea: F. J. P. Sachse, 118 †
Oorsprongs-en afstammings legenden van den Marindinees: J. Viegen, 346 †
Pygmies and Papuans: A. F. R. Wollaston, 232 †, 638 §
Wildeman-river (Zuid Nieuw-Guinea): F. F. Van der Ven, 669 †
New Guinea, German—
Deutsch Neu-Guinea: R. Neuhauss, 669 †
Kaiser-Wilhelms-Land; E. Werner 637 §
Kaiserin Augusta River Expedition, 220
Newman Co. Picture Post-cards of Californian Missions, 240 †
New Mexico—
Gran Quivira ruins in, 393
New South Wales—
Fishing, Commercial Marine, Future of: D. G. Stead, 346 †
New South Wales, historical, physiographical and economic: T. W. E. David and others, 581 †, 639 §
Tungsten mining industry: J. E. Carne, 460 †
New York—
Geographic interpretation of New York City: F. V. Emerson, 459 †
Larger physiographic features of New York: R. S. Tarr, 459 †
New Zealand—
Geology of Dun mountain subdivision, Nelson: J. M. Bell and others, 581 †
Geology of Greymouth Subdivision, North Westland: P. G. Morgan, 460 †
Islands, Outlying, of New Zealand: Lord Plunket, 118 †
New Zealand: M. Herz, 78 §
Uplift and subsidence near Wellington, Recent movements of: C. A. Cotton, 581 †
Volcanoes, Some New Zealand: J. M. Bell, 8 *
Ngauruhoe, Mount, New Zealand, 8, 18
Nhambiquára tribe, Brazil, 319
Nieger, —, Saharan Railway Survey Expedition, 443
Nieto, J. G., Informe del jefe de la Oficina de Longitudes, 345 †
Niger—
Sommet de boucle du Niger, Géographie physique et botanique: G. de Gironcourt, 344 †
Nigeria—
Economic development of, 161
Maps: Plan of Bauchi . . . Tin Fields, Northern Nigeria: A. F. Calvert, 585 †
Northern Nigeria: C. L. Temple, 149 *
Northern Nigeria, Report for 1910–11 (Col. Reports), 230 †
Population of Northern Nigeria, 153
Railways, 161
Southern Nigeria, Some experiences of: P. A. Talbot, 540
Survey, Southern Nigeria, Short account of: R. H. Rowe, 230 †
Nile—
Blue and White Niles, History of, 422, 425
Rains of Nile Basin and Nile Flood of 1910: J. I. Craig, 86 §, 344 †
Source of, History of discovery, 422–424
Nippoldt, A., Ueber das Wesen des Erdstromes, 120 †; Verteilung der Leitfähigkeit der Atmosphäre über dem Grossen Ozean, 221 §, 581 †
Nishimura, M., On Saijo Basin in Province of Aki, 343 †
Noble, A. H.: *see* Sherlock, R. L.
Nölke, F., Wurde die Eiszeit durch eine Temperaturerniedrigung hervorgerufen oder nicht, 119 †
Nordström, K. B., Iakttagelser öfver strandoch vattenvegetationen i vissa trakter af Medelpad, 453 †
Normandy—
Coast, Normandy: C. Merk, 72 §
North sea—
Hydrographischen Verhältnisse der Nord- und Ostsee: A. Merz, 671 †
Norway—
Census Returns, 66
Gletschergebiete des südlichen Norwegens, Kürze Uebersicht über die: J. Rekstad, 453 †
Handbook for Travellers. Norway Sweden and Denmark: K. Baedeker, 111 †
Maps: Aschehougs Lommeatlas over Norge: K. Gleditsch, 675 †; Geologisk Kart over Kongeriget Norge, 675 †; Kystkarter (Norges Geog. Opmaaling), 240 †; Topografisk Kart over Kongeriket Norge, 675 †
Pays de Voss et du Hardanger Fjord: C. Vallaux, 226 †
Rambles in Norway: H. Simpson, 205 §
Récents travaux géographiques et géologiques dans Norvège septentrionale: C. Rabot, 226 †

Nova Scotia—
Ice action near Grand Lake, Cape Breton, Some effects of: W. S. Brodie, 580 †
Tin in Nova Scotia, On occurrence of: H. Piers, 580 †
Nugent, E. L., Plane Surveying, 209 §
Numerical Tables: C. F. Casella & Co., 461 †
Nun river—
Erforschung des Nun-Flusses, 115 †
Nuttall, Mrs., New Drake Documents discovered by, 621
Nyasaland—
Hunter and Settler, Nyasaland for: D. D. Lyell, 326 §
Nyström, E. T., Coal and mineral resources of Shansi Province, China, 455 †

O.

Oberhummer, E., Sinaifrage, 664 †
Obituary for Year 1911–1912..93
Obrucheff, V. A., Geological sketch of auriferous deposits of Siberia, 229 †; On question of origin of loess, 233 †
Obst, E., Landschaften Issansu und Iramba, 579 †; Von Mkalama ins land der Wakindiga, 115 †
Oceanography—
Bathyrhéomètre à enregistrement continu des directions et des vitessges des courants de fond: Y. Delage, 582 †
Conseil Permanent International pour l'exploration de la Mer. Bulletin Hydrographique pour 1909-1910.. 119 †
Depth, Greatest, off Northern Mindanao, 447
Depths of the Ocean: Sir J. Murray and J. Hjort, 233 †, 413 §
Deux anciens instruments d'Océanographie: L. Germain, 671 †
Fortschritte der Ozeanographie: Prince of Monaco, 582 †
Hilfsmittel für direkte Strommessungen in grossen Meerestiefen: K. Grein, 582 †
Meerwassers, Ueber die Messung der Wasserstoffionenkonzentration des: S. Palitzsch, 234 †
Modern Oceanography: H. R. Mill, 411 *
Physical Oceanography: B. Helland-Hansen, 415
Probleme der Ozeanographie in ihrer Bedeutung für die Geologie: K. Andree, 462 †
Progresos de Oceanografia: Prince of Monaco, 582 †
Quantitative Bestimmungen von stickstoffverbindungen und von gelöster Kieselväure im Meerwasser: E. Raben, 119 †
Science of the Sea: G. H. Fowler, 233 †, 412 §
Oceanography—*continued.*
Verdunstung auf dem Meere: R. Lütgens, 91 §, 119 †
Vie dans les océans: L. Joubin, 348 †
Odenwald—
Geologischen Exkursionen im Odenwald, Führer bei: G. Klemm. 576 †
Oehler, E, Ascent of Mount Mawenzi, Kilimanjaro, 563
Œnothera trichocalyx, 507
Ogawa, T., Japanese Northern Explorations during Tenmei and Bunka periods, 455 †
Ogilvie, A. G., Some Recent Observations and Theories on Structure and Movements of Glaciers of Alpine Type, 280 *
Ollerton—
Geology of country around Ollerton: G. W. Lamplugh, 454 †
Ollone, Vicomte H. d', In forbidden China: the D'Ollone Mission, 1906–09, 112 †
Olufsen, O., Second Danish Pamir Expedition, 343 †
Omaha Tribe: A. C. Fletcher and F. La Flesche, 117 †
Omo river, Abyssinia, 374
Omori, F., Eruptions and earthquakes of Asama-Yama, 85.§ 343 †
O'Neill, J. S., Native Suspension Bridge over the Dihong, 214
Ontario—
Archæological Report, 1911..231 †
Climate of Northern Ontario: R. F. Stupart, 666 †
Extension of territory, 87
Post-glacial faults near Banning: A. C. Lawson, 580 †
Opitz, C., Eisenbahn- und Verkehrs-Handatlas von Russland, 584 †
Ordnance Survey Maps of England and Wales, † 121, 464, 583, 673
Orient: *see* East
Orleans, Duke of, Hunters and Hunting in Arctic, 79 §
Orthography for Unwritten Languages, 92, 655
Osaka plain, Japan, Agriculture of, 604
Östrup, J., Verdens ældste Kulturland, 113 †
Oswald, F., Armenien, 661 †; Kisii high lands north-east of Victoria Nyanza, 539
Otero basin, New Mexico, Pulsatory Climatic changes in, 266
Ovis canadensis galliardi, 515
Owen, R. A., Notes on Panama Canal, 346 †
Oxford—
Meteorological observations made at Radcliffe Observatory, Results of, 1906–1910: A. A. Rambaut, 661 †
Oxford Country: R. T. Günther, 227 †, 432 §
Survey of Oxford in 1772: H. Salter, 227 †, 431 §

P.

PACCARD's lost narrative: H. F. Montagnier, 225 †
Pacific—
Coast, Atlantic and Pacific Types of: E. H. L. Schwarz, 294 *
"Deeps" of Pacific Ocean and their origin: J. Geikie, 462 †
Depths in Pacific, 447
Leitfähigkeit der Atmosphäre über dem Grossen Ozean, Verteilung der: A. Nippoldt, 221 §, 581 †
Maps: Meteorological Charts (U.S. Weather Bureau), †127, 240, 352, 587, 680; Pilot Charts (U.S. Hydrog. Office), † 127, 240, 468, 587, 680
Problems of Pacific: F. Fox, 348 †, 639 §
Secrets of Pacific: C. R. Enock, 116 †, 641 §
Pacific Islands—
Südsee-Inseln: G. Friederici, 118 †
Page, J. W., Geographical factors controlling sites of towns, 672 †; Lands and their peoples, 236 †; Man and the Earth, 582 †
Pajaritan plateau, New Mexico, Ruins in, 397
Palai valley, Ruins of ancient fortified dwellings in, 330
Palestine—
Civilization in Palestine, History of: R. A. S. Macalister, 229 †, 439 §
Handbook for Travellers. Palestine and Syria, etc.: K. Baedeker, 113 †, 325 §
Palitzsch, S., Ueber die Messung der Wasserstoffionenkronzentration des Meerwassers, 234 †
Palmer, H., First ascent of Grand Mountain, 580 †; Notes on exploration and geography of Northern Selkirks, 458 †
Pamir—
Languages spoken in Western Pamir: A. Hjuler, 663 †
Second Danish Pamir Expedition: O. Olufsen, 343 †
Panama—
Old Panama and Castilla del Oro: C. L. Anderson, 117 †
Panama: A. Edwards, 76 §
Panama and Canal to-day: F. Lindsay, 668 †
Panama Canal—
Canal de Panama: P. Hagemans, 580 †
Notes on Panama Canal: R. A. Owen, 346 †
Panama Canal: Sir B. T. Leech, 346 †; Ditto: W. J. Showalter, 346 †
Panama Canal and its relation to British Empire: V. Cornish, 668 †
Panhuys, L. van, Expedition in Dutch Guiana, 319
Panjkora Kohistan, Summer Exploration in: S. H. Godfrey, 45 *
Papago Indians, Mexico, 504, 507, 516
Papua—
Exploring in: L. L. Bell, 346 †
Paraná river, Argentina Republic, 336
Parco, F. Lo, "L'ultima Thule" nell' intuizione e nella divinazione di F. Petrarca, 234 †
Parodes, R., Altiplanicie paceña, 231 †
Parinacochas, Lake, a composition of its water: G. S. Jamieson and H. Bingham, 669 †
Paris—
Géologie du Bassin de Paris: P. Lemoine, 70 §
Map Collection at Bibliothèque Nationale, 449
Parker, E. W., Conservation of Pennsylvania Coal Supplies, 459 †
Parker, H. C., Attempted Ascent of Mount McKinley, 566, 650
Parkinson, T. W. F., Lancashire Region, 111 †
Parmentier, J., De Khartoum à Addis-Abeba, 457 †
Parvu, M., Défense naturelle des rochers contre l'action destructive de la mer, 347 †
Paschinger, V., Schneegrenze im Verschiedenen Klimaten, 120 †
Passarge, S., Physiologische Morphologie, 461 †; Ueber die Abtragung durch Wasser, Temperaturgegensätze und Wind, etc., 347 †
Patagonia—
Geologisch-petrographische Studien in der patagonischen Cordillera: P. D. Quensel, 459 †
Surveys, Recent, in Northern Patagonia: B. Willis, 607 *
Patrak, Kohistan, 49
Paul, A. W., obituary, 449
Paulsen, O., Plankton on a submarine bank, 462 †; Studies on vegetation of Transcaspian Lowlands, 343 †
Peach, G. N., and others, Geology of Knapdale, Jura and Northern Kintyre, 112 †
Peake, H., remarks on "Distribution of Early Bronze Settlements in Britain," 200
Pearson, H. D., Pibor River. I. Upper Sources, 486 *
Peary, R. E., Medal presented by Peary Arctic Club to, 91; and others, Crocker Land Expedition, 581 †
Peiper, O., Küsten- und Seefischerei in Deutsch-Ostafrika, 664 †
Pemba Island, Survey of, J. E. E. Craster, 564, 664 †
Penck, A., Lage der deutschen Grossstädte, 226 †, 628 §; Ueber Polygonboden in Spitzbergen, 461 †
Penck, W., Studien am Kilauea (Hawaii), 669 †
Pennines—
Geographical problems of Mid-Pennines: A. Wilmore, 661 †
Pennsylvania—
Coal supplies, Conservation of: E. W. Parker, 459 †

Pereira, G., A visit to Labrang Monastery, North-West China, 415 *
Périgny, Comte M. de, Ruines de Nakcun, 667 †
Persia—
Persien: A. F. Stahl, 112 †
Persische Ueberlandbahnen: F. Meinhard, 112 †
Photographs of Mekran Coast: — Spencer, 680 †
Strangling of Persia: W. M. Schuster, 578 †
Perthshire—
Cambridge County Geographies. Perthshire: P. Macnair, 227 †
Floods, Recent: P. Macnair, 661 †
Peru—
Anotaciones à la "Historia Indica" del Captain P. Sarmiento de Gamboa: H. Steffen, 117 †
Perugia—
Provincie d'Italia sotto l'aspetto geografico e storico. Provincia di Perugia: P. Locci, 453 †
Boundary between Peru and Bolivia, 89
Climate and crops, Studies on: H. Arctowski, 668 †
Pervinquière, L. Sur confins de Tripolitaine de Méditerranée à Ghadames, 665 †
Petrarca, F., "L'ultima Thule" nell' intuizione e nella divinazione di: F. Lo Parco, 234 †
Pettazzoni, R., Civiltà africane, 664 †
Peucker, K., Generalkarte des Königreiches Bulgarien, 674 †; Karte von Makedonien Altserbien und Albanien, 464 †
Peyrissac, L., Frontière Franco-Libérienne, 230 †
Pfaundler, R., Deutsche Sprachgebiet in Südungarn, 226 †; Verbreitungsgebiet der deutschen Sprache in Westungarn, 576 †
Philadelphia, Industrial: J. J. Macfarlane, 668 †
Philip & Sons, G., *Daily Mail* War Map of Balkan Peninsula, 673 †
Philippines—
Forests of Philippines: J. P. Goode, 455 †
Geology and mineral resources of Aroroy district: H. G. Ferguson, 663 †
Influence of Philippine climate on white men, Observations on: W. P. Chamberlain, 85 §, 455 †
Mineral resources of Philippine Islands: W. D. Smith, 113 †
Soils, Philippine, and some of the factors which influence them: A. J. Cox, 113 †
Philippson, A., Topographische Karte des Westlichen Kleinasien, 465 †
Phillimore, L., In the Carpathians, 72 §
Photographic Exposure Records and Diary, 1912, Burroughs Wellcome & Co., 121 †
Photographic Survey—
Orientierungsprobleme der Photogrammetrie: E. Kruppa, 670 †
Photographs—
African Natives, West, showing tribal marks: G. F. Tomlinson, 128 †
Arizona: I. N. Dracopoli, 127 †
Californian Missions, Picture post-cards of: O. Newman Co., 240 †
Canadian Rocky mountains: A. L. Mumm, 127 †
Canary Islands, Gran Canaria: D. A. Bannerman, 587 †
Cook, Captain James, Memorial to: E. P. Grant, 127 †
Jan Mayen: Duchess of Bedford, 127 †
Lapland, Swedish: B. Mesch, 588 †
Lohit Brahmaputra: N. Williamson, 680 †
Mekran Coast, Persia: — Spencer, 680
Mesopotamia, Lower: Sir W. Willcocks, 680 †
Morocco, Southern: A. J. Douglas, 128 †
Newfoundland and Labrador: H. Reeve, 240 †
Salif, Yemen: H. E. Poynter, 352 †
Siberia and Mongolia: G. C. Binsteed, 128 †
Somaliland and Abyssinia: R. Hayne, 588 †
Tarn River and Montserrat: A. W. Brown, 127 †
Photography, Colour, for Mountaineers: I. Clark, 349 †
Physiography for High Schools: A. Arey and others, 582 †
Pibor river—
Beir Country: H. H. Kelly, 497 *
Upper Sources: H. D. Pearson, 486 *
Picquet, V., Colonization Française dans l'Afrique du Nord, 432 §
Pieri, S., Dalla toponomastica della valle dell' Arno, 452 †
Pierre, C., Relations entre le haut Oubangui et la vallée du Nil, 664 †
Piers, H., On occurrence of tin in Nova Scotia, 580 †
Piggott, H., School Visits and Journeys, 82 §; and R. J. Finch, Dent's Historical and Economic Geographies, 672 †
Pinilla, C. F.: *see* Ballivian, M. V.
Pinto, E. R., on tribes of Brazil, 319
Pirie, J. H. H.: *see* Brown, R. N. C.
Place-names—
Noms geographiques Sauvages: E. Rouillard, 231 †
Plaice—
Migrations of plaice: A. C. Johansen, 671 †
Plankton—
Appareil pour préparation et triage du plankton: C. Francotte, 233 †
Submarine bank, Plankton on a: O. Paulsen, 462 †

Plants—
British Plants—their Biology and Ecology: J. F. Bevis and H. J. Jeffery, 204 §
Water relations of Desert Plants: D. T. MacDougal, 120 †
Platania, G., Eruption of Etna, Sept. 1911, 560
Playne, S., Cape Colony, 76 §
Plunket, Lord, Outlying islands of New Zealand, 118 †
Pöch, R., Ueber die Kunst der Buschmänner, 457 †
Pogue, J. E., Great rainbow natural bridge of Southern Utah, 231 †
Poland—
Königreich Polen als strategisches Terrain: G. Kuchinka, 227 †
Polar Expeditions—
Expéditions polaires depuis 1800: J. Denucé, 118 †
Polynesia—
Histoire de la Polynésie Orientale: A. C. E. Caillot, 78 §
Pool, R. J., Glimpses of Great American Desert, 459 †
Popescu-Ciocănel, C., Influenta orientala in toponimia românească, 453 †
Portugal—
Arte Portugueza Primitiva, I. Opintor Nuno Gonçalves, 1450: J. de Figueiredo, 234 †
Winter Holiday in Portugal: G. Baker, 321 §
Portuguese Colonies: Sir H. H. Johnston, 463 †
Power, F. D., Coalfields and collieries of Australia, 581 †, 423 §
Poynter, H. E., Photographs of Salif, Yemen, 352 †
Pratt, W. E. (*see also* Adams, G. L.), Eruption of Taal Volcano, 455 †
Price, M. P., Siberia, 663 †
Prichard, H. H., letter on Gulf stream, 95
Products—
Produits Coloniaux: G. Capus and D. Bois, 82
Projections: *see* Cartography
Prothero, G. W.: *see* Ward, A. W.
Provence and Languedoc: C. Headlam, 660 †
Provence—
Alps de Provence: G. Tardieu, 340
Prud'homme, L. A., Baie d'Hudson, 580 †
Prussia—
Maps: Uebersichts-Karte der Vereinigten Preussischen und Hessischen Staatseisenbahnen, 584 †
Plagefenn bei Chorin: H. Conwentz and others, 341 †
Population, 62
Vorpommerns Küsten und Seebäder: M. Friederichsen, 576 †
Ptolemy's Maps—
Handschriftliche Ueberlieferung der Ptolemäuskarten: J. Fischer, 649 §, 672 †
Puisaye: G. Goujon, 341 †
Purdie, F. B., Ancient temples and cities of New World—Xochicalco, 667 †
Puyehue pass, Andes, 614
Pyrenees—
Phénomènes météorologiques dans Pyrénées: — Rudaux, 111 †
Rambles in Pyrenees: F. H. Jackson, 226 † 432 §

Q.

Quebec—
Extension of territory, 88
Maps: Magnetic Declination observed in 1909 accompanying report of O. Klotz, 676 †
Queensland—
Geology of West Moreton, Notes on: R. A. Wearne and W. G. Woolnough, 460 †
Quena-Qoseir Road: G. D. Murray, 456 †
Quensel, P. D., Geologie der Juan Fernandezinseln, 346 †; Geologisch-petrographische Studien in der patagonischen Cordillera, 459 †
Quervain, A. de, Aus der Wolkenwelt, 233 †; Trans-Greenland Expedition, 566

R.

Rabbath Ammon at Amman, Megalithic monuments of: D. Mackenzie, 663 †
Raben, E., Dritte Mitteilung über quantitative Bestimmungen von Stickstoffverbindungen und von gelöster Kieselsäure im Meerwasser, 119 †
Rabot, C., Expedition Scott vers le Pôle sud, 346 †; Récents travaux géographiques et géologiques dans la Norvège septentrionale, 226 †
Radnorshire—
Cambridge County Geographies. Radnorshire: L. Davies, 577 †
Raestad, A., Spitsberg dans l'histoire diplomatique, 670 †
Railway Conquest of the world: F. A. Talbot, 83 §
Rain—
Work of rain and rivers: T. G. Bonne, 640 §, 670 †
Rand McNally & Co., Indexed County and Township Pocket Maps, 124 †, 351 †
Ransome, F. L., Geology and ore deposits of Breckenridge district, 116 †
Ratzel, F., Anthropogeographie, 120 †
Raulin, V., Distribution of rain in Mauritius during 1891–1900.. 230 †
Raunkiær, B., Expedition in East Central Arabia, 331; Expédition de Société royale danoise de Géographie en Arabie, 661 †
Reder, —, Eine forstliche Studienreise nach Französische-Kongo, etc., 458 †
Redway, J. W., Commercial Geography, 82 §

Reed, W. G., Cyclonic distribution of Rainfall in United States, 231 †
Reeps, K. A., Grundzüge einer Landeskunde von Bornholm, 452 †
Reeve, H. F., Gambia, 74 §; Photographs of Newfoundland and Labrador, 240 †
Reeves, E. A., Geography at British Association, 537 *; New and improved instruments and apparatus for geographical surveying, 539
Refraction—
Kimmtiefenbeobachtungen : H. Meyer, 462 †
Reid, C., Relation of present plant population of British Isles to glacial period, 661 †; and others, Geology of country round Tavistock and Launceston, 454 †
Reid, H. F., Observations on Structure and movement of Glaciers, 280, 283, 285, 294
Reindl, J., Bayrischen Hochseen, 341 †; Wilhelm Götz, 235 †
Rekstad, J., Kürze Uebersicht über die Gletschergebiete des südlichen Norwegens, 453 †; Ueber die Erosion der Meeresbrandung, 347 †
Rémond, G., Recent Journey in Tripoli and Cyrenaica, 532 §
Renfrewshire—
Cambridge County Geographies, Renfrewshire: F. Mort, 227 †
Réunion—
Volcan de la Réunion : A. Lacroix, 230 †
Reviews—
Africa, Animal Life in : J. Stevenson-Hamilton, 207
Africa, North, 'Twixt Sand and Sea : C. F. and L. Grant, 206
Africa, Through Heart of: F. H. Melland and E. H. Cholmeley, 433
Africa, West, Alone in : M. Gaunt, 435
Afrique du Nord, Colonization Française dans : V. Piquet, 432
Afrique occidentale Française : L. Sonolet, 553
Amazon Jungle, In the : A. Lange, 635
America, South, Woman's Winter in : C. Cameron, 209
American Archæology, South : T. A. Joyce, 435
American Colonies, 1583–1763 : A. W. Tilby, 438
Anson, Admiral Lord, Life of : W. V. Anson. 82
Archæology, British, Byways in : W. Johnson, 71
Arctic, Hunters and Hunting in : Duke of Orleans, 79
Argentina, Twentieth Century Impressions of, 76
Assyria, Ancient : C. H. Johns, 439
Australia, Across : B. Spencer and F. J. Gillen, 328
Australia, Coalfields and Collieries of : F. D. Power, 639
Bismarck-Archipel, Eine Forschungsreise im, 76
Reviews—*continued.*
Black Mountain to Waziristan, From : H. C. Wylly, 632
Brasilien, Flora der Umgebung der Stadt São Paulo in : A Usteri, 326
Britain in the Tropics : A. W. Tilby, 438
British Isles, Geography of : J. T. Unstead and E. G. Taylor, 72
British Plants : their Biology and Ecology : J. F. Bevis and H. J. Jeffery, 204
British Vegetation, Types of : A. G. Tansley, 203
Byzantinische Quellen zur Länder- und Völkerkunde : K. Dieterich, 556 †
Canterbury : G. R. S. Taylor, 329
Cape Colony : S. Playne, 76
Cape of Adventure : I. D. Colvin, 207
Carpathians, In the : L. Phillimore, 72
Caucasus, Guide to Mountains of : V. A. Merkulof, 73
Chad. De Bordeaux au Tchad par Brazzaville, 634
Chaouïa, A Travers la : Capt. Grasset, 553
China : Sir R. K. Douglas, 74
China in Transformation : A. R. Colquhoun : 206
China, The New : H. Borel, 205
Chinese, The : J. S. Thompson, 633
Circulations Atmosphériques, Contribution á l'Etude des Relations existant entre les : A. Vialay, 437
Climate and Weather : H. N. Dickson, 80
Colonie modèle. Birmanie sous Régime britannique : J. Dautremer, 633
Congo Méconnu : J. Dybowski, 553
Dalmatien und österreichische Küstenland : E. Brückner and others, 550
Earth, Making of : J. W. Gregory, 640
East, Sea Road to the : A. J. Sargent, 559
Erd- und Kulturkunde, Quellen und Forschungan zur : R. Stübe, 556
Europe : a supplementary Geography : J. F. and A. H. Chamberlain, 558
Europe, Geography of : T. A. Smith, 558
Finland, Atlas de, 321
Finland : E. Young, 72
Gambia : H. F. Reeve, 74
Geographie des Welthandels und Weltverkehrs : E. Friedrich, 640
Geography, Clarendon : F. D. Herbertson, 211
Geography, Commercial : J. W. Redway, 82
Geography, High School : C. R. Dryer, 558
Geography, Notes, British Empire : J. C. Chute, 558
Geography, Physical, for South African Schools, 329
Geography, Teaching of Modern Subjects : J. Welton and W. P. Welpton, 557

Reviews—*continued.*
Glaciologischen Beobachtungen der Danmark-Expedition: I. P. Koch und A. Wegener, 554
Goshen, Land of: R. H. Brown, 435
Guiana, British, French and Dutch: J. Rodway, 554
Histoire de l'Expansion Coloniale des Peuples Européens de la Néerlande et du Danemark: C. De Lannoy et H. van der Linden, 438
History and Geography, Association of: A. J. Berry, 211
History, Dawn of: J. L. Myres, 80
India, Levelling of Precision in: S. G. Burrard, 322
India, Southern, Omens and Superstitions of: E. Thurston, 206
Island: W. von Knebel, 430
Italy, Plain-Towns of: E. R. Williams, 205
Italy's War for a Desert: F. McCullagh, 552
Jerusalem: Sir C. M. Watson, 329
Jura méridional: J. B. Martin, 320
Kaiser-Wilhelms Land: E. Werner, 637
Kamerun. Mission Cottes au Sud-Cameroun: A. Cottes, 434
Labrador. Captain Cartwright and his Labrador Journal: C. W. Townsend, 76
Licht und Luft des Hochgebirges, Studie über: P. C. Dorno, 80
London, Making of: Sir L. Gomme, 321
Lossiemouth, Account of Measurement of Geodetic Base Line at (Board of Agriculture and Fisheries), 555
Majorque, Voyage à l'Ile: J. Leclercq, 72
Man and his conquest of Nature: M. I. Newbigin, 557
Manchuria, Japanese in: E. L. V. Cordonnier, 325
Maps: How they are made and how to read them: H. N. Dickson, 438
Marlborough Country: H. C. Brentnall and C. O. Carter, 557
Mongolian Altai at sources of Irtish and Kobdo: W. W. Sapoznikoff, 323
Morocco after Twenty-five Years: R. Kerr, 325
Morocco in Diplomacy: E. D. Morel, 325
Nederlands Landschappen, De Ontwikkeling van: W. L. Bouwmeester, 71
New Zealand: M. Herz, 78
Normandy Coast: C. Merk, 72
North-West Frontier, Campaigns on: H. L. Nevill, 73
Norway, Rambles in: H. Simpson, 205
Nyasaland for Hunter and Settler: D. D. Lyell, 326
Outfit and Equipment for Traveller, Explorer, and Sportsman: E. Reynolds-Ball, 81
Oxford country: R. T. Günther, 432
Oxford, Survey of: H. Salter, 431
Reviews—*continued.*
Pacific, Problems of: F. Fox, 639
Pacific, Secrets of: C. R. Enock, 641
Palestine and Syria: K. Baedeker, 325
Palestine, Civilization in: R. A. Macalister, 439
Panama: A. Edwards, 76
Paris, Géologie du Bassin de: P. Lemoine, 70
Place-names: J. White, 637
Polynésie Orientale, Histoire de la: A. C. E. Caillot, 78
Portugal, Winter Holiday in: G. Baker, 321
Produits Coloniaux: G. Capus und D. Bois, 82
Pygmies and Papuans: A. F. R. Wollaston, 638
Pyrenees, Rambles in: H. Jackson, 432
Railway Conquest of World: F. A. Talbot, 83
Rain and Rivers, Work of: G. Bonney, 640
Regional Geography; The World: J. B. Reynolds, 557
Rocks and their Origin: G. A. J. Cole, 439
Royaumes des Neiges: C.-E. Bonin, 74
Rubber Industry: W. T. Torrey and M. S. Manders, 211
Russia: Sir D. M. Wallace, 632
Santiago: G. C. Gallichan, 432
Scented Islands and Coral Gardens: C. B. Mackellar, 79
School visits and Journeys: H. Piggott, 82
Sea Fisheries: M. A. Hérubel, 83
Selkirk Mountains: A. O. Wheeler, 327
Spitzbergen, Mit Zeppelin nach: A. Miethe und H. Hergesell, 79
Statesman's Year-book, 1912: J. S. Keltie, 329
Sudan, Western, Notes on some languages of: P. A. Benton, 633
Surveying, Geodetic: E. L. Ingram, 209
Surveying, Plane: P. C. Nugent, 209
Switzerland in Sunshine and Snow: E. B. d'Auvergne, 205
Tangier, England's Lost Atlantic Outpost: E. M. G. Routh, 326
Terre, La, Géographie Générale: P. C. d'Almeida, 439
Tibet Revolté: J. Bacot, 551
Tobermory Argosy: R. P. Hardie, 432
Trekking the Great Thirst: A. W Hodson, 75
Tripoli, the Mysterious: M. L. Todd, 552
Tripolis: E. Banse, 553
Tripolitaine d'hier et de Demain: H. M. de Mathuisieulx, 552
Tropical Hygiene: C. P. Lukis and R. J. Blackham, 329
Tyrol, Tramps through: F. Wolcott, 632
United States; Forest Physiography: I. Bowman, 208

Reviews—*continued.*
Venezuela: L. V. Dalton, 637
Vitcos, the last Inca Capital: H. Bingham, 636
Wales, South, Transport Facilities in Mining and Industrial Districts of: C. S. Howells, 632
Weather, Our: J. S. Fowler and W. Marriott, 436
West Indies, British: A. E. Aspinall, 328
World, Book of knowledge of all kingdoms . . . that are in the: Sir C. Markham, 640
World, Longmans' Geographical Series, 211
Rey, G., Una excursión en el Bierzo, 577 †
Reynolds, J. B., Regional Geography; the World, 349 †, 557 §
Reynolds-Ball, E., Outfit and equipment for traveller, explorer, and sportsman, 81 §, 236 †
Rhine—
Roman cities along course of, 628
Rhodesia—
Development and progress of Rhodesia: G. de H. Larpent, 665 †
Rhone—
Cañon du Rhône, Sur profil en long et l'alluvionnement du: E.-A. Martel, 111 †
Ricci, L., Ricerche sul lago di Capo di Lago, 226 †
Ricci, P. M., Opere storiche del, edite dal P. T. Venturi, 582 †
Rice—
Geographische Verbreitung des Reisbaues, etc.: C. Bachmann, 234 †
Rich, J. L. (*see also* Tarr, R. S.), Gravel as a resistant rock, 118 †
Richards, Sir F. W., obituary, 573
Richthofen, Baron von, Atlas von China, 585 †; China; Ergebnisse eigener Reisen und darauf gegründeter Studien, 454 †; Mitteilungen des Ferdinand von Richthofen-Tages, 1911..121 †
Ridgway, R., Birds of North and Middle America, 116 †
Riebu Stream, Abyssinia, 373
Ries, H., and J. Keele, Preliminary report on clay and shale deposits of Western Provinces of Canada, 666 †
Riff—
Berber in den Bergen des Rif: O. C. Artbauer, 457 †
Rikli, M., and others, Vom Mittelmeer zum Sahara-Atlas, 664 †
Rincon valley, terraces for agriculture in, 277
Rio Negro territory, Patagonia, 614
Ripples—
Formation of ripple marks, etc.: A. P. Brown, 671 †
Riso-Patron, L., Linea de frontera con la República de Bolivia, 117 †; Plano topográfico de las provincias del norte, 117 †
River-erosion—
Cross-cutting and retrograding of stream-beds: F. S. Dellenbaugh, 671 †
Rivers—
Direzione dei corsi d'acqua e lo sviluppo della superficie topografica: G. Azzi, 348 †
Gewässernamen: C. Täuber, 463 †
River-terraces—
Entstehung und Umbildung von Flussterrassen: B. Dietrich, 348 †
Road-books and Itineraries, Notes on British and Irish: Sir H. G. Fordham, 539
Robert, M., A propos des traces laissés par d'anciennes populations le long de la bordure occidentale en lac Moëro, 456 †
Rockhill, W. W., The 1910 census of population of China, 228 †
Rocks—
Défense naturelle des rochers contre l'action destructive de la mer: M. Parvu, 347 †
Depth of Zone of Flow in Earth's Crust: F. D. Adams, 338 §, 461 †
Photographs of Canadian Rocky Mountains: A. L. Mumm, 127 †
Rocks and their origin: G. A. J. Cole, 118 †, 439 §
Rocky mountains—
Temperature . . . in central Rocky Mountain region, Variations of: A. J. Henry, 231 †
Rodway, J., Guiana, British, French and Dutch, 232 †, 554 §
Rohan-Chabot, Comte J. de, Expedition into Southern Interior of Angola, 564
Rohlfs, Gerhard, Lebensbild eines Afrikaforschers: K. Guenther, 672 †
Rohrbach, P., Strategischen Passagen und Engen des Mittelmeers, 453 †
Romanes, J., Geological notes on peninsula of Nicoya, Costa Rica, 580 †; Geology of part of Costa Rica, 346 †
Rome—
Clima di Roma: F. Eredia, 226 †
Rome: H. I. Inman, 342 †
Roraima, Latest journey to: H. E. Crampton, 668 †
Rose, A., and J. C. Brown, Lisu Tribes of Burma-China Frontier, 342 †
Rosén, P. G., Meridiangradmatning vid Sveriges Västra Kust, 453 †
Ross, L., Inselreisen, 341 †
Rotomahana, Eruption at, 14
Rouillard, E., Noms Geographiques Sauvages, 231 †
Roume, V. E., Chemins de fer en Afrique et le transafricain, 229 †
Roussilhe, H., Mission hydrographique Congo-Oubangui-Sanga, 344 †
Routh, E. M. G., Tangier: England's Lost Atlantic Outpost, 326 §
Rowe, R. H., A short account of Southern Nigeria Survey, 230 †

Royal Geographical Society—
Address to: Lord Curzon, 1 *
Anniversary Meeting, 1912..96
Annual dinner, 99
Building Fund, 1, 2
Livingstone Centenary, 1913. Provisional programme for meeting, 650
Medals and Awards, Presentation of, 96
Meetings for Session 1911–1912..96, 109, 224, 451, 657
New House, letter from Lord Curzon on, 355
Research Department, Scope of, 4; Work of; J. L. Myres, 356 *
Royal Society—
Catalogue of . . . books in Library of, 235 †
Celebration of 250th Anniversary, 222
Record of Royal Society of London, 583 †
Signatures in first Journal-book and Charter-book of Royal Society, 583 †
Ruapehu, Mount, New Zealand, 16, 17
Rubber Industry: W. T. Torrey and M. S. Manders, 211 §
Rudaux, —, Phénomènes météorologiques dans Pyrénées, 111 †
Rudolph, E., and S. Szirtes, Kolumbianische Erdbeben am Jan. 1906..668 †
Rühl, A., Elba, 452 †
Rumania—
Scythia Minor, Berdjan, Dobrogia, Studiu istoricogeografic: Ionescu-Dobrogeanu, 453 †
Toponimia românească, Influenta orientala in: C. Popescu-Ciocănel, 453 †
Russell, W. S. C., Jan Mayen expedition of 1911..347 †
Russia—
Canal schemes in Russia, 642
Maps: Carte géologique détaillée du bassin du Donetz: L. Loutouguine, 675 †; Commercial-industrial map of European Russia: V. P. Semenof-Tian-Shansky, 675 †; Eisenbahn- und Verkehrs-Hand-atlas von Russland: C. Opitz, 584 †; European Russia (Top. Dept., General Staff), 237 †, 350 †; Southern Frontier Regions of Asiatic Russia (Military Top. Dept.), 122 †, 237 †, 585 †
Russia: Sir D. M. Wallace, 632 §, 660 †
Russische Grossschiffahrtswege: R. Hennig, 229 †
Russian Turkestan—
Earthquake in town of Verny, etc.: S. N. Voletski, 113 †
Erdbeben in Russisch Turkestan: G. Merzbacher, 113 †
Vegetation of Transcaspian Lowlands: O. Paulsen, 343 †

S.

Sacco, F., Il Gruppo dell' Argentera, 225 †
Sachse, F. J. P., Noord Nieuw-Guinea, 118 †, 646 §
Sadler, E. H., Notes on geography of British East Africa, 114 †
Sahara—
Magnétisme terrestre le Sahara Contribution à l'étude du: N. Villatte, 457 †
Railway survey expedition under Captain Nieger, 443
Salines du Sahara soudanais: M. Cortier, 457 †
Sahlström, K. E., Jordskalf i Sverige, 1907–1910 . . . 577 †
St. Lawrence: W. Wood, 667 †
Salif, Yemen, Photographs of: H. E. Poynter, 352 †
Salmon—
Acclimatation du Saumon dans Bassin de Méditerranée: L. Fage, 462 †
Salter, H., Survey of Oxford in 1772, 227 †, 431 §
San Agustin, Columbia, Ancient remains at: K. T. Stoepel, 319
Sandstone pinnacles: N. H. Darton, 670 †
Santa Cruz Valley of S. Arizona, 268, 270
Santerno—
Fenomeni della erosione nelle Argille azzurre del pliocene nel bacino del Santerno: G. Azzi, 226 †
Santiago—
Clima, aguas, suelus de Provincia de Santiago del Estero: J. Fernández, 117 †
Santiago: G. C. Gallichan, 432 §
Story of Santiago de Compostella: C. G. Hartley, 111 †
São Paulo—
Flora der Umgebung der Stadt São Paulo: A. Usteri, 326 §
Sapozhnikoff, W. W., Découvertes dans l'Altai de Mongolie, 662 †; Mongolian Altai at sources of Irtish and Kobdo, 323 §
Sapper, K., Ueber Fliesserde und Strukturboden auf Spitzbergen, 461 †
Sarawak: Sir P. Cunynghame, 662 †
Sargent, A. J., Sea Road to the East, 235 †, 559 §; The Tyne, 469 *
Sargent, R. H., Progress of Alaskan topographic surveys, 666 †
Sari Kiz, the Troad, Height of, 45
Sarmiento de Gamboa, Capitan Pedro, Anotaciones á la "Historia Indica" del: H. Steffen, 117 †
Saskatchewan—
Maps: Saskatchewan (Dept. of Interior), 467 †
Sasse, J., Onzekerheden en Vraagpuuten betreffende de antropologie vam Nederland, 226 †
Satnlois river, Asia Minor, 29, 33
Saville, M. H., Map of Provinces of Manabi and Guayas, Ecuador, 238 †
Savoy—
Alpes de Savoie: E. Gaillard, 341 †
Sawicki, L., Beiträge zur Morphologie Siebenbürgens, 576 †; Massif central français et Massif de Bihar, 83 §, 340 †

Sayce, A. H., remarks on "Garden of Eden and its Restoration," 145
Scamander river, the Troad, 41
Scandinavia—
Maps: Geologisk Oversiktskarta över Skandinavien: A. E. Törnebohm, 350 †
Marina, glaciala relikter i nordiska insjöar: L. A. Jägerskiöld, 453 †
Scented Islands and Coral Gardens: C. B. Mackellar, 79 §
Schäffer, M. F. S., Survey of Maligne lake, 334
Schlaginhaufen, O., Reisewege und Aufenthalte in Melanesien, 117 †
Schlüter, O., Distribution of ancient settlements in Germany, 212; Zur Geschichte der deutschen Landschaft, 341 †
Schmeckebier, L. F., National parks from scientific and educational side, 667 †
Schmidt, A., Niederschlagskarten des Taunus, 226 †
Schmidt, J. F. J., and K. Knoch, Zur Meteorologie von Athen, 341 †
Schmidt, W., Nachweis von Perioden langer Dauer, 118 †
Schnauder, —: *see* Leyden, — v. der
Schnoor, E., Mappa da Viação Ferrea do Brazil, 676 †
School Economic Atlas: J. G. Bartholomew and L. W. Lyde, 677 †
School Visits and Journeys: H. Piggott, 82 §
Schröder-Strauz, —, Proposed Arctic Expedition, 220
Schubert, R., Geologischer Führer durch die Nördliche Adria, 575 †
Schück, A., Alte Schiffskompasse und Kompassteile im Besitz Hamburger Staatsanstalten, 347 †; Der Kompass, 347 †
Schuster, W. M., Strangling of Persia, 578 †
Schwartz, —, Mubi-expedition, 665 †; Survey of Boundary between Sierra Leone and French Guinea, 643
Schwarz, E. H. L., Atlantic and Pacific Types of Coast, 294 *; South African Geology, 666 †
Scilly—
Scilly-Inseln: G. W. v. Zahn, 111 †
Scinde in the Forties; being the journal and letters of Colonel Keith Young: A. F. Scott, 578 †
Scotia, Antarctic work of the, 547
Scotland—
Geographical factor in Scottish Independence: W. R. Kermack, 111 †
Geology of Knapdale, Jura and North Kintyre: B. N. Peach and others, 112 †
Junior Geography of Scotland: D. Frew, 342 †
Making of Scotland: W. R. Kermack, 661 †
Maps: Bartholomew's new reduced Survey map of Scotland, 584 †; Official Railway Map of Scotland, 236 †; Survey Atlas of Scotland: J. G. Bartholomew, 122 †
River development in Central Scotland: H. M. Cadell, 539
Scott, A. F., Scinde in the Forties: being the journal and letters of Colonel Keith Young, 578 †
Scott, R. F., Antarctic Expedition, 447; Antarctic journeys and researches of, 543
Sea: *see* Oceanography
Seals—
Northern Elephant Seal: C. H. Townsend, 462 †
Sechuan—
Voyage au Sseu-tch'ouan et aux marches orientales du Tibet: G. C. Toussaint, 662 †
Sedimentation—
Chute des sédiments dans l'eau, Etude sur la: R. de Buen, 671 †
Fallung einer Tontrübungen in Salzlösungen: C. Forch, 462 †
Sedov, —, Expedition by North-East Passage, 646
Sefve, I., Fossilen pferde Südamerikas, 669 †
Segonzac, Marquis de, Populations du Maroc, 665 †
Seiner, F., Geographische Forschungen im politisch interessanten Okawango-Gebiete, 457 †
Seismology: *see* Earthquakes
Montagnes éruptives, Sur diversité génétique des: A. Stubel, 671 †
Selkirks—
Climbs in Southern Selkirks: E. W. Harnden, 580 †
Exploration and geography of Northern Selkirks, Notes on: H. Palmer, 458 †
Grand Mountain, First ascent of: H. Palmer, 580 †
Selkirk Mts., Guide for Mountain Climbers and Pilgrims: A. O. Wheeler, 231 †, 327 §
Semenof-Tian-Shansky, V. P., Commercial-industrial map of European Russia, 675 †
Semites, Garden of Eden of, 130
Semple, E. C., Influence of Geographical Conditions upon Japanese Agriculture, 589 *
Sequoia gigantea of California, 402, 403, 408
Seri Indians, Mexico, 517
Seton, E. T., Arctic Prairies, 345 †
Shakespear, J., Lushei Kuki Clans, 578 †
Shansi—
Coal and mineral resources of Shansi Province, China: E. T. Nyström, 455 †
Shaw, E. W., New system of quaternary lakes in Mississippi Basin, 117 †
Sherlock, R. L., and A. H. Noble, On glacial origin of clay-with-flints of Buckinghamshire, 577 †

Shockley, W. H., letter from, on Mountain Sickness, 653
Showalter, W J., Panama Canal, 346 †
Siachen or Rose Glacier, Some notes on my 1912 Expedition to: F. B. Workman, 615 *
Siam—
Gulf of Siam, Contributions to knowledge of East Coast of: H. E. Frandsen, 456 †
Royal Survey Dept., General Report on operations of, 1909–10.. 663 †
Siberia—
Geological sketch of auriferous deposits of Siberia: V. A. Obrucheff, 229 †
Glaciations quaternaires dans Sibérie méridionale, etc.: A. Allix, 662 †
Gmelin, J. G., 1709–1755, der Erforscher Sibiriens: O. Gmelin, 343 †
Photographs: G. C. Binsteed, 128 †
Sea-route to Siberia, Proposed expeditions, 220
Siberia: M. P. Price, 663 †
Sieberg, A., Eruption of Etna, Sept. 1911, 561
Sieger, R., Zum historischen Atlas der Österreichischen Alpenländer, 452 †
Sierra Leone—
Boundary between Sierra Leone and French Guinea, 643
Cannibals of Sierra Leone: R. G. Berry, 665 †
Sierra Nevada, *Sequoia gigantea* of the, 402, 403
Sifton, Praed's Map of Central Europe, 674 †
Sikhota-alin—
Geographische Arbeiten im Gebiete des Sichota-alin-Gebirges: E. Romer, 663 †
Sikkim—
Mountains of Northern Sikkim and Garhwal: A. M. Kellas, 241 *
Silesia—
Maps: Schulhandkarte des Herzogtums Schlesien: R. Kober, 464 †
Silva, H., on tribes of Brazil, 319
Simar, T., Bibliographie Congolaise de 1895 à 1910.. 456 †
Simmons, A. T., and E. Stenhouse, A class book of physical geography, 236 †
Simon, E., Ein alter Plan der beiden Hauptstädte des ehemaligen Königreiches Chusan, 228 †
Simonds, F. W., Geographic influences in development of Texas, 668 †
Simpson, H., Rambles in Norway, 205 §
Sinai—
Sinaifrage: E. Oberhummer, 664 †
Siwa—
Meteorological expedition to: Mohammad Kasim, 579 †
Oasis of: C. V. Stanley, 344 †
Sjögren, H, Om kratern vid Canyon Diablo, Arizona, 116 †
Sligo—
Bronze-age carns on Carrowkeel Mountain, Report on exploration of: R. A. Macalister and others, 227 †
Smith, B., Glaciation in Black Combe District, Cumberland, 641
Smith, E., Life of Sir J. Banks, 348 †
Smith, H. M., Pearl fisheries of Ceylon, 228 †
Smith, J. W., Climate of city and country compared, 667 †
Smith, R. A., remarks on "Early Bronze Age Settlements in Britain," 199
Smith, S. P., Hawaiki, original home of Maori, 232 †
Smith, T. A., A geography of Europe, 121 †, 558 §
Smith, V. G.: *see* Hunton, A. S.
Smith, W. D., Mineral resources of Philippine Islands, 113 †
Smith, W. W., Geologic reconnaissance of island of Mindanao, etc., 663 †
Smyth, H. W., Union of S. Africa. Mines Department Annual Report, 115 †
Snow-line—
Schneegrenze im verschiedenen Klimaten: V. Paschinger, 120 †
Snow mountains, New Guinea, 638
Soane, E. B., To Mesopotamia and Kurdistan in disguise, 663 †
Sölch, J., Modrene, Modroi und Gallus, 228 †; Ueber die Lage von Kaisarein in Bithynien, 228 †
Somaliland—
British Somaliland: R. E. Drake-Brockman, 665 †
Italian - Abyssinian Frontier in Somaliland, Expedition under C. Citerni, 216
Photographs: R. Hayne, 588 †
Songir, Western India, Water tank at, 179
Sonolet, L., L'Afrique occidentale Française, 553 §
Sonora Desert, Mexico: I. N. Dracopoli, 511 *; ditto: C. Lumholtz, 503 *
Sorre, M., Etude sur Transhumance dans région Montpelliéraine, 213 §, 452 †
Soul, J., Climat du Kikouyou, 114 †
South Pole: *see* Antarctic
Spain—
Estudios geográficos de España en el siglo xvi: A. Blázquez, 111 †
Glaciation, Former, in Northern Spain: W. Halbfass, 642
Maps: Map of Spain showing railways, etc., 237 †
Speleology—
Biospeologica. Enumeration des grottes visitées 1909–11: R. Jeannel et E. G. Racovitza, 671 †
Spencer, B., Introduction to study of certain native tribes of Northern Territory, 669 †; and F. J. Gillen, Across Australia, 328 §, 460 †
Spencer, —, Photographs of Mekran Coast, Persia, 680 †

Spethmann, H., Ueber Bodenbewegungen auf Island, 452 †
Spitsbergen—
Charakteristische Bodenformen auf Spitzbergen: W. Meinardus, 670 †
Detritussortierung . . . auf Spitzbergen, Beobachtungen über: W. Meinardus, 461 †
Fliesserde und Strukturboden auf Spitzbergen: K. Sapper, 461 †
Histoire diplomatique, Spitsberg dans: A. Raestad, 670 †
Karreeboden auf Spitzbergen, Ueber: A. Miethe, 461 †
Maps: Green Harbour av Isachsens norske Spitsbergenekspedition 1909–10, 677 †
Polygonboden in Spitzbergen, Ueber: A. Penck, 461 †
Shelly Moraine of Sefström Glacier, etc.: G. W. Lamplugh, 118 †
Wüsternerscheinungen auf Spitzbergen: B. Högbom, 461 †
Zeppelin nach Spitzbergen, Mit: A. Miethe und H. Hergesell, 79 §
Staal, J. J., Exploratie van Nieuw-Guinea, 346 †
Stahl, A. F., Persien, 112 †
Stainier, X., Du rôle des variations de température dans dynamique externe du globe, 582 †
Stanley, C. V., Oasis of Siwa, 344 †
Stanley Pool—
Cartographie du Congo français, Région du Stanley Pool: A. Le Gallois, 344 †
Statesman's Year-book, 1912: J. S. Keltie, 329 §
Statistics—
Hübners Geographisch-statistische Tabellen aller Länder der Erde: F. von Juraschek, 349 †
Staub, W., Geologische Beschreibung der Gebirge zwischen Schächental und Maderanertal, 577 †
Stead, D. G., Future of Commercial Marine Fishing in New South Wales, 346 †
Stebbing, E. P., Game Sanctuaries and Game Protection in India, 343 †
Stefani, C. de, Studio dei movimenti del suolo nell' ultimo cinquantennio, 119 †
Stefansson, V., Explorations in Northern Canada, 443; Technique of Arctic winter travel, 581 †
Steffen, H., Anotaciones à la "Historia Indica" del Captain P. Sarmiento de Gamboa, 117 †
Stein, Sir M. A., Archæological Explorations on North-West Frontier of India, 330
Stenhouse, E.: *see* Simmons, A. T.
Stephenson, W. T., remarks on "The Tyne," 485
Stevenson, E. L., Genoese world map, 1457..349 †
Stevenson-Hamilton, J., Animal Life in Africa, 207 §
Stiffe, A. W., obituary, 574
Stoddard, F. W., Tramps through Tyrol, 225 †
Stoepel, K. T., on ruins at San Agustin, 319
Stolberg, A., Bilder aus Grönland, 669 †
Stoll, H., Islande et sa population, 452 †
Stone, J. H., England's Riviera, 342 †
Stort, P. van G., Boundary delimitation in Borneo, 643
Strahan, A., and T. C. Cantril, Geology of South Wales Coalfield, 661 †; remarks on "Work of Research Department," 369
Strokovski, V. A., Sur le climat de Urumci, 229 †
Strümpell, K., Geschichte Adamauas nach mündlichen Ueberlieferungen, 229 †
Stuart, M., Geology of Henzada District, Burma, 342 †
Stübe, R., Quellen und Forschungen zur Erd- und Kulturkunde, 556 §
Stubel, A., Sur diversité génétique des montagnes éruptives, 671 †
Stupart, R. F., Climate of Northern Ontario, 666 †
Sudan—
Cotton growing in Anglo-Egyptian Sudan: J. A. Hutton, 579 †
Geography and definition of, 421
Languages of Western Sudan, Notes on: P. A. Benton, 115 †, 633 §
Progress in Sudan: Sir C. M. Watson, 420 *
Sudan, French—
Haut-Sénégal-Niger. Géographie economique: J. Meniaud, 664 †
Suffolk—
Landguard Fort, History of: J. H. Leslie, 454 †
Sugar—
World's cane sugar industry: H. C. P. Geerligs, 672 †
Sully, J., Italian Travel Sketches, 576 †
Sulte, B., Coureurs de Bois au lac Supérieur, 1660..459 †
Sunlight, Tropical, Effects on Mankind: P. Freer, 650
Superior, Lake—
Coureurs de Bois au lac Supérieur, 1660: B. Sulte, 459 †
Geology of Lake Superior region: C. R. Van Hise and C. K. Leith, 116 †
Resources in Lake Superior Region, Progressive development of: L. Martin, 117 †
Suru river, West Africa, 333
Surveying—
Effects of errors in surveying: H. Briggs, 118 †
Geodetic Surveying: E. L. Ingram, 209 §
Instruments and apparatus for geographical surveying, New and improved: E. A. Reeves, 539
Plane Surveying: P. C. Nugent, 209 §

Surveying—*continued.*
System of surveying with a Tacheometer, Notes on: H. G. Dempster, 347 †
Tacheometer, Surveying with the: N. Kennedy, 232 †
Sutton, J. R., A note on land and sea breezes of South Africa, 457 †
Suvorof, E. R., From an excursion to Commander Islands, 113 †
Svartisen, dens geologi: R. Marstrander, 227 †
Swat, Kohistan mountains, 46
Sweden—
Bau des Skandinavischen Hochgebirges in Jamtland und Lappland, Ueber dem: N. Tilmann, 453 †
Hydrografiska Byrån; Arsbok 2, for år 1910..577 †
Jordskalf i Sverige, 1907-10: K. E. Sahlström, 577 †
Klarälfvens serpentinlopp och flodplan: S. De Geer, 577 †
Maps: Generalstabens Karta öfver Sverige, 584 †
Meridiangradmatning vid Sveriges Västra Kust: P. G. Rosén, 453 †
Pluies en Suéde, 1860–1910 (Inst. Central de Météorologie), 453 †
Strand- och vattenvegetationen i vissa trakter af Medelpad, Iakttagelser öfver: K. B. Nordström, 453 †
Switzerland—
Astronomisch-geodätische Arbeiten in der Schweiz, 454 †
Census Returns, 64
Deutsche und Romanen in der Schweiz: J. Zemmrich, 111 †
Eiszeit in der Nordschweiz: E. Blösch: 577 †
Geologische Beschreibung der Gebirge zwischen Schächental und Maderanertal: W. Staub, 577 †
Maps: Matériaux pour Carte géologique de la Suisse, 465 †
Sunshine and Snow, Switzerland in: E. B. d'Auvergne, 205 §
Troisième excursion en Suisse du Laboratoire de géographie physique de l'Université de Paris: J. Delpech, 227 †
Verdunstung auf den Seen am Nordfuss der Alpen während der grossen Hitze- und Durrezeit 1911; J. Maurer, 454 †
Sykes, G.: *see* MacDougal, D. T.
Sympher, —, Karte der Deutschen Wasserstrassen, 350 †
Syria—
Syrische Städtebilder: M. Holzmann, 456 †
Trade with Syria: E. Weakley, 456 †

T.

Taal Volcano, Eruption of: W. E. Pratt, 455 †; Ditto: C. Worcester, 663 †
Tabora Railway, German East Africa, 443
Tacke, B., and B. Lehmann, Norddeutschen Moore, 576 †
Tahltan Indians: G. F. Emmons, 231 †
Tal, capital of Kohistan, 51
Tal pass, Kohistan, 55
Talbot, F. A., Economic prospects of New British Columbia, 458 †; Railway Conquest of the World, 83§
Talbot, P. A., Some experiences of Southern Nigeria, 540
Tangier—
Tangier; England's Lost Atlantic Outpost: E. M. G. Routh, 326 §
Tansley, A. G., Types of British Vegetation, 203 §
Tarawera, Mount, New Zealand, Eruption of, 12, 14
Tarbyn-bogdo-ola, Altai, 324
Tardieu, G., Alpes de Provence, 340
Tarr, R. S., Glaciers and Glaciation of Alaska, 230 †; Larger physiographic features of New York, 459 †; Observations on glaciers, 289, 294; and J. L. Rich, Properties of ice, 462 †
Tarthar depression, Tigris, 138
Tasmania—
Nomenclature, Record of: J. Moore-Robinson, 460 †
Täuber, C., Gewässernamen, 463 †
Taunus—
Niederschlagskarten des Taunus: A. Schmidt, 226 †
Taupo volcanic zone, 8
Taurus, Ueber den: W. Endriss, 456 †
Tavistock—
Geology of country round Tavistock and Launceston: C. Reid and others, 454 †
Taylor, G. R. S., Canterbury, 329 §
Temperature (*see also* Meteorology)—
Height and temperature of isothermal region, etc.: W. J. Humphreys, 233 †
Isothermal maps of World, 518
Täglichen Gang der Temperatur an der Bodenoberfläche und in dem untersten Luftschichten, Beziehungen zwischen dem, 462 †
Temperatur auf dem Brocken und in der gleichen Höhe der freien Atmosphäre, etc.: A. Hildebrandt, 337 †, 582 †
Variations de température dans dynamique externe du globe, Du rôle des: X. Stainier, 582 †
Temple, C. L., Northern Nigeria, 149 *
Templeton, R. S., Ceylon. Survey Dept. Administration Reports, 1910–11..577 †
Tent Peak glacier, Himalaya, 243, 245
Teram Kangri Peaks, Determination of positions and heights of: V. D. Collins and B. T. Wyatt, 440, 578 †
Termination Land, Antarctic, 91
Terrestrial magnetism—
Carnegie Institution of Washington, Dept. of Terrestrial Magnetism of, 462 †

Terrestrial magnetism—*continued.*
Lunare variation des Erd-magnetismus: W. van Bemmelen, 671 †
Magnetische Abweichung im Anfang des 16. Jahrhunderts: F. Nansen, 234 †
Wesen des Erdstromes, Ueber das: A. Nippoldt, 120 †
Terrier, A., Accords franco-allemands et negociations Marocaines, 114 †
Texas—
Geographic influences in development of Texas: F. W. Simonds, 668 †
Théel, H., Priapulids and Sipunculids dredged by Swedish Antarctic Expedition, 346 †
Thermal Regions of the Globe: A. J. Herbertson, 518 *
Thicle, E. O., remarks on "Some New Zealand Volcanoes," 24
Thompson, H. Y., Illustrations from one hundred manuscripts in library of, 673 †
Thompson, J. S., The Chinese, 633 §
Thompson, R. C., Til-Barsip and its Cuneiform inscriptions, 456 †
Thorbecke, F., Manenguba-Hochland, 115 †
Thostrup, C. B., Den fortidige Bebyggelse of Grønlands Nordøstkyst, 347 †
Thule—
"Ultima Thule" nell' intuizione e nella divinazione di F. Petrarca: F. Lo Parco, 234 †
Thurston, E., Omens and Superstitions of India, 112 †, 206 §
Tiahuanacu, Bolivia, Excavations of Ruins at: O. Buchtien, 645
Tian-Shan—
Studienreise in den westlichsten Tianschan: F. Machatschek, 663 †
Tibet—
Andrade's journey to Tibet, 1624: C. Wessels, 332
"South Eastern Tibet and Mishmi Hills," letter from F. M. Bailey on, 657
Tibet révolté: J. Bacot, 342 †, 551 §
Tides—
Methode zur Messung von Hochseegezeiten: E. Barkow, 120 †
Tierra del Fuego—
Indigenes de la Tierra del Fuego: R. Dabbene, 667 †
Tiessen, E., Chinesiche Stadt, 455 †
Tigris—
Floods of Tigris, Control of, 138
Til-Barsip and its Cuneiform incriptions: R. C. Thompson, 456 †
Tilby, A. W., Britain in the Tropics, 438 §; English People overseas. Vol. 1. American Colonies, 1583–1763 .. 116 †, 438 §
Tilho, —, Expedition in Lake Chad Region, 645
Tilmann, N., Ueber den Bau des skandinavischen Hochgebirges in Jämtland und Lappland, 453 †
Tin—
Bibliography of geology . . . of Tin: F. L. and E. Hess, 672 †
Tittmann, O. H., Present activities of Coast and Geodetic Survey, 667 †
Tizard, T. H., remarks on "Thermal Regions of the Globe," 530
Tobermory Argosy, a problem of Spanish Armada: R. P. Hardie, 227 †, 432 §
Todd, M. L., Tripoli the mysterious, 230 †, 552 §
Togo—
Boundary between Togo and Dahome, 644
Tolmachef, L. P., Sur géologie des Wrangel et Herald, 118 †
Tomlinson, G. J., Photographs of West African natives, 128 †
Tongariro range, New Zealand, 16
Topography—
Topologie et topographie: P. Girardin, 233 †
Törnebohm, A. E., Geologisk oversiktskarta över Skandinavien, 350 †
Torres straits—
Cambridge Anthropological Expedition to Torres Straits, Reports of, 346 †
Torrey, W. T., and M. S. Manders, Rubber Industry, 211 §
Toussaint, G. C., Voyage au Sseu-tch'ouan et aux marches orientales du Tibet, 662 †
Towns—
Geographical factors controlling sites of towns: J. W. Page, 672 †
Quelques études de Villes: L. Gallois, 672 †
Townsend, C. H., Northern Elephant Seal, 462 †
Townsend, C. W., Captain Cartwright and his Labrador Journal, 76 §
Trade-route—
Dampferwege von Durban nach Japan oder Sibirien (Deutschen Seewarte), 120 †
Transcaspian lowlands, Studies on vegetation of: O. Paulsen, 343 †
Transliteration of Persian, Afghan and Arabian words, A system for, 463 †
Transvaal—
Geology of Murchison Range and District: A. L. Hall, 666 †
Maps: Geological Map of Transvaal, 123 †
Problem of Rand Banket: R. B. Young, 666 †
Transylvania—
Morphologie Siebenbürgens, Beitrage zur: L. Sawicki, 576 †
Travellers—
Outfit and equipment for traveller, etc.: E. Reynolds-Ball, 81 §, 236 †
Trinidad—
Birth of an island near coast of Trinidad: T. O. Bosworth, 459 †
Tripoli—
Agricolo della Tripolitania e della Cirenaica: F. Cortesi, 458 †

Tripoli—*continued.*
Climatologia di Tripoli e Bengasi: F. Eredia, 458 †
Confins de Tripolitaine de Méditerranée à Ghadames: L. Pervinquière, 665 †
En Tripolitaine: E. Bernet, 344 †
Italy's war for a desert: F. McCullagh, 230 †, 552 §
Journey, Recent, in Tripoli and Cyrenaica: G. Rémond, 532 §
Libya Italica: P. Vinassa de Regny, 345 †
Maps: Nuove Province Italiane Tripolitania e Cirenaica, 123 †
Resources of Tripoli: J. W. Gregory, 115 †
Senussi and Military issue in Tripoli: A. S. White, 666 †
Tripoli the mysterious: M. L. Todd, 320 †, 552 §
Tripoli e Cirenaica: A. Borzi, 458 †
Tripolis: E. Banse, 553 §
Tripolitaine d'hier et de demain: H. M. de Mathuisieulx, 552 §
Tripolitania e Cirenaica, Impressioni e Studi: P. Vigoni, 115 †
Tripolitanien: E. Vatter, 345 †
Tristan da Cunha—
Occupation de Tristan da Cunha par Grande-Bretagne: H. Dehérain, 458 †
Troad—
Agriculture, 43
Notes on the Troad: W. Leaf, 25 *
Population, 42
Timber industry, 35
Tropical climate—
Influence du Climat tropical sur l'Européen blond: J. H. Kohlbrugge, 672 †
Tropical Diseases Research Fund. Report of Advisory Committee, 1911..234 †
Tropical Hygiene: C. P. Lukis and R. J. Blackham, 329 §
Tropical Sunlight: P. C. Freer, 463 †, 650 §
Tropics—
Kulturwert der Verschiedenen Landschaftstypen in den Tropen: K. Sapper, 672 †
Tropics and Pigment: W. Lowe, 672 †
Trotha, Captain v., Landeserkundung im Bezirk Langenburg, 665 †
Troughs—
Trogfrage: D. R. Lucerna, 119 †
Troy, Study in Homeric geography: W. Leaf, 578 †
Tucson, Arizona, 268
Tunis—
Canal du Djerid: G. Barrion, 458 †
Maps: Carte de la Tunisie (Service Géo. de l'Armée), 350 †
Turkey—
Maps: Empire Ottoman: R. Huber, 350 †
Partage de Turquie: A. J. Wauters, 577 †
Physical environment as a factor in present condition of Turkey: E. Huntingdon, 454 †
Turkey-in-Asia—
Maps: Sketch-map to show railways in Asiatic Turkey (Geog. Section, General Staff), 237 †
Turley, R. T., Climatic and Economic Conditions of Northern Manchuria, 57 *
Turtle mountain, Alberta, Report of Commission appointed to investigate, 231 †
Tuscany—
Tuscia Romana: E. Barbarich, 453 †
Tuyoni village ruins, New Mexico, 398
Tuzla, Salt works at, 33
Tyne, The, A. J. Sargent, 469 *
Tyrell, J. B., Expedition in Hudson Bay Region, 88, 645
Tyrol—
Tramps through Tyrol: F. W. Stoddard, 225 †; Ditto: F. Wolcott, 632 §
Twenhofel, W. H., Physiography of Newfoundland, 88 §, 116 †

U.

Ubangi—
Chemin de fer franco-allemand du Kamerun à l'Ubangi, Projet de: A.-J. Wauters, 115 †
Relations entre le haut Oubangui et vallée du Nil: C. Pierre, 664 †
Ufipa—Land und Leute: D. P. Fromm, 664 †
Uhart, P., Memoria del viaje de exploración á los esteros de Iberá, 335 §, 459 †
Ulens, R.: *see* Vliebergh, E.
Ulungur lake, Mongolia, 324
Umpleby, J. B., An old erosion surface in Idaho, 345 †
United Kingdom—
British Plants, their Biology and Ecology: J. F. Bevis and H. J. Jeffery, 204 §
British Vegetation, Types of: A. G. Tansley, 203 §
Distribution of Early Bronze Age Settlements in Britain: O. G. S. Crawford, 184 *, 304 *
Geography of British Isles: J. T. Unstead and E. G. Taylor, 72 §
Lakes, British, On periodicity of phytoplankton of: W. and G. S. West, 660 †
Navigation intérieure en Grande-Bretagne: A. Demangeon, 454 †
Plant population of British Isles, Relation of the present, to glacial period: C. Reid, 661 †
Road-books and itineraries, Notes on British and Irish: Sir H. G. Fordham, 539
Romanization of Roman Britain: F. Haverfield, 660 †
United States—
Arid lands in Western United States, Progress in reclamation of: F. H. Newell, 231 †

United States—*continued.*
Climate of city and country compared: J. W. Smith, 667 †
Coast and Geodetic Survey, Report of superintendent, 459 †; Coast and Geodetic Survey, Present activities of: O. H. Tittmann, 667 †
Commerce, Foreign, and navigation of United States, 1910..667 †
Forest physiography: I. Bowman, 208 §
Geologic formation in United States, Some relations between gravity anomalies and: W. Bowie, 218 §, 345 †
Geological Survey, Annual Report of Director of, 667 †
Magnetic declination in United States for January 1, 1910. Distribution of: R. L. Faris, 345 †
Maps: Geologic Atlas of United States (U.S. Geol. Survey), 351 †; Orographical reduced survey map of United States and part of Canada: J. G. Bartholomew, 586 †; Rand-McNally Indexed County and Township Pocket Maps, 124 †, 351 †; Topographic Maps, 1911 (U.S. Geol. Survey), 124 †
Minérales des États-Unis, Ressources: F. Guillotel, 231 †
National Parks, 565; National parks from scientific and educational side: L. F. Schmeckebier, 667 †
Rainfall in United States, Cyclonic distribution of: W. G. Reed, 231 †
Spirit levelling, Results of: R. B. Marshall, 117 †
Topography and isotatic Compensation upon intensity of gravity, Effect of: J. F. Hayford and W. Bowie, 117 †
Vegetation, Climax, to islands and peninsulas, Relation of: R. M. Harper, 231 †
University College, London, Catalogue of periodical publications..in library of: L. Newcombe, 583 †
Unstead, J. F., remarks on "The Tyne," 485; and E. G. R. Taylor, Commercial Geography, correspondence on, 94, 223; Essentials of world geography, 673 †; Geography of British Isles, 72 §; Philips' Comparative Series of Wall Atlases of the Continents, 236 †, 678 †
Ural—
Expédition des frères Kuznetzov à l'Oural Arctique en 1909, Résultats scientifiques de: H. Backlund, 576 †
Urumchi—
Climat de Urumci: V. A. Strokovski, 229 †
Ussing, N. V., Geology of country around Julianehaab, 670 †
Usteri, A., Flora der Umgebung der Stadt São Paulo in Brasilien, 326 §
Utah—
Rainbow Natural bridge of South Utah: J. E. Pogue, 231 †

V.

Vageler, P., Lateritbildung und Tropen-Klima, 671 †
Vahl, M., Zones et biochores géographiques, 234 †
Valcamonica, Ricerche sul lago di Capo di Lago (Lago Moro) in: L. Ricci, 226 †
Vallaux, C., Pays de Voss et du Hardanger Fjord, 226 †
Vallée, L., Bibliothèque Nationale. Notice des documents exposés à la section des cartes, 449 §, 461 †
Vallejo, J., Por el Atrato, 232 †
Vancouver—
Maps: Indexed Guide map of City of Vancouver and Suburbs, 676 †
Vancouver island, Mrs. J. W. Henshaw's account of, 444
Van de Wiele, C., Évolution du Système fluvial de la Moyenne et de la Basse-Belgique, 452 †
Van der Linden, H.: *see* Lannoy, C. de
Van der Ven, F. F., Wildeman-river (Zuid Nieuw-Guinea), 669 †
Van Hise, C. R., and C. K. Leith, Geology of Lake Superior region, 116 †
Varley, F. J., On Water Supply of Hill Forts in Western India, 178 *
Vatter, E., Tripolitanien, 345 †
Vegetational cycles, Causes of: H. C. Cowles, 671 †
Vélain, C., Érosion éolienne et ses effets dans régions désertiques, 233 †
Veletski, S. N., Earthquake in town of Verny, etc., 113 †
Venezuela—
Geology of: L. V. Dalton, 668 †
Venezuela: L. V. Dalton, 637 §, 669 †
Venturi, P. T., Opere storiche del P. Matteo Ricci, 582 †
Verbiest, Ferdinand: A. Gueluy, 235 †
Vernadski, V. I., Sur régime des gaz dans l'écorce terrestre, 233 †
Vespucci—
Americ Vespuce: H. Vignaud, 221 §, 235 †
Vevino Khor, Sudan, 497, 498
Vialay, A., Contribution à l'Etude des Relations existant entre des Circulations Atmosphériques, 437 §
Victoria—
Rainfall Observations 1840–1910 (Bureau of Meteorology), 669 †
Victoria Land, Antarctic, Mountain Range of, 545, 546
Viegen, J., Oorsprongs-en afstammingslegenden van den Marindinees, 346 †
Views and reviews from outlook of an anthropologist: Sir H. Johnston, 236 †
Vignaud, H., Americ Vespuce, 221 §, 235 †; Henry Harrisse, 235 †
Vigoni, P., Tripolitania e Cirenaica, Impressioni e Studi, 115 †
Villatte, N., Contribution à l'étude du magnétisme terrestre dans le Sahara, 457 †

Villiers, J. A. J. de, Boundaries of British Guiana, 668 †
Vinassa de Regny, P., Libya Italica, 345 †
Vinokurof, A., Issyk Mountain Lake, 441
Vladimirof, K. N., On changes in delta of Amu-daria, 113 †
Vliebergh, E., and R. Ulens, L'Ardenne, 340 †
Vocikof, A., Climate of Kislovodsk, 113 †
Vogel, C., Karte des Deutschen Reichs im Massstab 1 : 500,000 . . 237 †
Volcanoes—
Vulkanologische Studien auf einigen Inseln des Atlantischen Oceans : M. V. Komorowicz, 348 †
Volga and Obi-Irtish Canal scheme, 643
Volta Region, Upper, West Africa, Hydrography of, 333

W.

Wagner, H., Geographisches Jahrbuch, 463 † ; Measurements of Land and Water areas on Earth's surface, 568
Waimangu geyser, New Zealand, 15
Wakuluwe tribe, Central Africa, 433
Wal, J. T. J. de, Survey of Idenburg River, Dutch New Guinea, 645
Wales—
Geology of South Wales Coalfield. Country round Cardiff : A. Strahan and T. C. Cantril, 661 †
Mining and Industrial Districts of South Wales and Monmouthshire, Transport facilities in : C. S. Howells, 632 §
Wallace, L. A., R.G.S. award to, 99
Wallace, Sir D. M., Russia, 632 §, 660 †
Wallis, B. C., First book of general geography, 583 † ; Use of Formulæ in Quantitative Geography, 175 *
Walther, J., Gesetz der Wüstenbildung in Gegenwart und Vorzeit, 581 †
Wang, Chung Yu, Bibliography of mineral wealth and geology of China, 228 †
Ward, A. W., G. W. Prothero and S. Leathes, Cambridge Modern History Atlas, 238 †
Ward, H. F., and J. W. Milligan, Handbook of British East Africa, 343 † ; Sketch-map of East Africa Protectorate showing Game Reservations and Uganda Railway, etc., 238 †
Ward, Lock & Co., Handbook to Belgium, 111 †
Ward, R. de C., Meteorological interest of a voyage to Brazil, 119 †
Warren, P. D., Ceylon. Survey Dept. Administration Reports, 1909 . . 577 †
Warren, S. H., On correlation of Prehistoric "Floor" at Hullbridge, 227 † ; On late glacial stage in valley of river Lea, 660 † ; remarks on "Distribution of Early Bronze Age Settlements in Britain," 201
Warrnambool, Ancient buried vessel at : G. G. McCrae, 460 †
Water—
Couleurs des Eaux, Origine des : K. Loppens, 462 †
Water, in liquid and five solid forms, under pressure : P. W. Bridgman, 462 †
Watson, Sir C. M., International map of World, 427 ; Jerusalem, 329 § ; Progress in Sudan : the international map, 420 *
Wauters, A. J., Partage de Turquie, 577 † ; Projet de chemin de fer franco-allemand du Kamerun à l'Ubangi, 115 †
Wavell, A. J. B., Modern Pilgrim in Mecca and a siege in Sanaa, 661 †
Weakley, E., Trade with Syria, 456 †
Wearne, R. A., and W. G. Woolnough, Notes on geology of West Moreton, Queensland, 460 †
Weather, Mount, Temperature at : A. J. Henry, 668 †
Weathering—
Periglaziale Fazies der mechanischen Verwitterung : W. v. Lozinski, 119 †
Wedderburn, E. M., Investigation of temperature distribution in Loch Earn, 228 †
Weed, W[illegible]ysers, 461 †
Wegener, [illegible]lina und seine jüngste Entwicklung, 662 †
Wellcome Photographic Exposure Records and Diary, 1912 . . 121 †
Welpton, W. P : *see* Welton, J.
Welton, J., and W. P. Welpton, Teaching of Modern Subjects : Geography, 121 †, 557 §
Werner, E., Kaiser-Wilhelms-Land, 637 §
Wernicke, W., Gazelle-Halbinsel, 460 †
Werth, E., Aussersten Jungendmoränen in Norddeutschland, 576 †
Wessels, C., Antonio de Andrade's Journey to Tibet, 1624 . . 332
West, W. and G. S., On periodicity of phytoplankton of some British lakes, 660 †
West Indies—
British West Indies : A. E. Aspinall, 328 §
Visit to West Indies : A. W. Hill, 668 †
Westropp, T. J., Legendary Islands of North Atlantic, 648
Wetar island—
Maps : Schetskaart van het Eiland Wetar, 237 †
Wetherell, H. B., New preliminary geography, 583 †
Whakatane fault, New Zealand, 8, 10
Wheeler, A. O., Motion of Yoho glacier, 116 † ; Selkirk Mountains, 231 †, 327 §
White, A. S., Senussi and Military issue in Tripoli, 666 †
White, J., on Mrs. Schäffer's Survey of Maligne Lake, 334 ; Place-names : Quebec, Thousand Islands, and Northern Canada, 637 §
White, J. C., remarks on "Mountains of Northern Sikkim and Garhwal," 262
White Island Crater, New Zealand, 21
Wieder, F. C., Onze kennis van de xvi^de eeuwsche cartographie, 234 †

Wild, H., Holiday walks in North-Countree, 660 †
Wilderness and jungle, A book of: F. G. Aflalo, 582 †
Willcock, W. J., Fenland, 111 †
Willcocks, Sir W., Garden of Eden and its Restoration, 129 *; Photographs of Lower Mesopotamia, 680 †; Survey in Mesopotamia: H. G. Lyons, 501 *
Williams, E. R., Plain Towns of Italy, 205 §
Williamson, N., Photographs of Lohit Brahmaputra, 680 †
Willis, B., Recent Surveys in Northern Patagonia, 607 *; Report on investigation of geological structure of Alps, 225 †, 452 †; What is terra firma? 233 †
Wills, L. J., Late glacial and post-glacial changes in Lower Dee Valley, 660 †
Wilmore, A., Some geographical problems of Mid-Pennines, 661 †
Wilson, A. W. G., Report on traverse through Southern part of North-West Territories of Canada, 580 †
Wilson, E., Antarctic work of, 544
Wilson-Barker, B., remarks on "Thermal Regions of the Globe," 531
Wiltshire—
  Maps, printed, of Wiltshire, from 1576 to 1885, Descriptive Catalogue of: T. Chubb, 228 †
Wittich, E., Explorations in Lower California, 89
Witting, R., Einige Bemerkungen zu dem Oberstehenden und zu Martin Knudsen's hydrographischen Tahellen, 461 †
Witwatersrand—
  Gold-mining industry, Past, present, and future of: F. H. Hatch, 115 †
Wolcott, F., Tramps through Tyrol, 632 §
Wolkenhauer, W., Aus der Geschichte der Kartographie, 672 †
Wollaston, A. F. R., Pygmies and Papuans, 232 †, 638
Wood, W., Animal sanctuaries in Labrador, 667 †; The St. Lawrence, 667 †
Woolnough, W. G.: *see* Wearne, R. A.
Worcester, C., Taal Volcano, 663 †
Workman, F. B., Explorations in Himalaya, 441; Some notes on my 1912 expedition to Siachen or Rose glacier, 615 *
World—
  International Map of World: Sir C. M. Watson, 427 *; letter from C. F. Close on, 655
  Longmans' Geographical Series. The World, 211 §
  Maps: Bacon's Library and Commercial Route Chart of, 677 †; International Map of World (Ordnance Survey, Southampton), 586 †; Wireless Map of World: Marconi's Wireless Telegraph Co., 351 †
  Railway conquest of the World: F. A. Talbot, 83 §
  Thermal regions of the Globe: A. J. Herbertson, 518 *
Wosho river, Abyssinia, 378
Wrangel Island—
  Géologie des Iles Wrangel et Herald: I. P. Tolmačev, 118 †
Wrenacre, H., Report on Coal-mining industry in Hokkaido, 562 §, 578 †
Wright, W. B., Drumlin Topography of South Donegal, 454 †; On occurrence of submerged forests . . . in Donegal, 454 †
Wyatt, B. T.: *see* Collins, V. D.
Wylly, H. C., From Black Mountain to Waziristan, 578 †, 632 §

Y.

Year-Book—
  Geographisches Jahrbuch: H. Wagner, 463 †
  Statesman's Year-book: J. S. Keltie, 329 §
Yellowstone National Park, Geological history of: A. Hague, 668 †
Yemen—
  Land und Leute im heutigen Jemen: Mehemed Raif Fuad-Bei, 661 †
Yoho Glacier, Motion of: A. O. Wheeler, 116 †
Yorkshire—
  Maps: Railway Map, Official, of Yorkshire District, 584 †
Yoruba tribe, Nigeria, 155
Yosemite—
  Hanging Valleys of Yosemite: W. W. Johnson, 345 †
  Yosemite trails: J. S. Chase, 580 †
Young, A. F., Scinde in the forties, 578 †
Young, E., Finland, 72 §; and J. Fairgrieve, Class-Book of Practical Geography, 82 §
Young, R. B., Problem of Rand Banket, 666 †
Yunnan—
  Chemin de fer du Yunnan, Le long du: A. Aymard, 113 †
  Ferrovia da Junnansen a Lao-cai: D. Mazzolani, 228 †
Yuruk people of the Troad, 36

Z.

Zahn, G. W. v., Die Scilly-Inseln, 111 †
Zambezi—
  Boundary, Anglo-Portuguese, 334
  Viktoriafälle des Sambesi und ihre Umgebung: J. Brunnthaler, 457 †
Zangietta river, Sudan, 496
Zemmrich, J., Deutsche und Romanen in der Schweiz, 111 †
Zemu Glacier and River, Himalaya, 242, 245
Zi-ka-wei, Observatoire de, Calendrier Annuaire, 1903–1910. . 228 †
Zimbabwe—
  Origin of Zimbabwe culture, Present position of discussion as to: R. N. Hall, 665 †
Zangeru, Northern Nigeria, 150
Zuni forest, United States, 403

INDEX TO MAPS.

EUROPE.

Britain, Early Bronze Age Settlements: Sketch-maps showing distribution of Celts, Beakers, and Lunulæ: O. G. S. Crawford, 186–197
Glacieluvial Kame near Polmont, Scotland, Sketch-map of, 171
Tyne—
Charts of Tyne, 1670..471; 1705..473; 1853..477
Tyne—*continued.*
Collieries of Tyne and Wear in 1787, showing Waggonways, Plan of, 475
Newcastle, River Tyne at, 479
Strategic Road Map, 481
River Tyne from Admiralty Charts, 1909..588
Population and Industries, Distribution of, 480

ASIA

Asia, Central: Sketch-map showing Route from Kashgar to Kowlun: C. Clementi, 680
Asia Minor: The Troad: W. Leaf, 128
Japan, Map of, to illustrate paper by E. Churchill Semple, 680
Labrang Monastery, North-West China, G. Pereira's route to, 417
Mesopotamia, Lower, from latest surveys of Sir W. Willcocks, 240, 588
Panjkora Kohistan, Sketch-map to illustrate route of S. H. Godfrey, 47
Sikkim, Northern, to illustrate paper by A. M. Kellas, 352

AFRICA.

Abyssinia, South-Western, G. Montandon's routes in, 468
Nigeria, Northern and Southern, to illustrate paper by C. L. Temple, 240
Pibor River, Sketch-map to illustrate papers by H. D. Pearson and H. H. Kelly, 489
Tripoli and Cyrenaica, sketch-map showing G. Rémond's route, 535

AMERICA.

Jamaica, Part of, showing relation of Earthquake damage (Jan. 1907) to Erosion of Land: V. Cornish, 301
Patagonia, Northern, Sketch-map to illustrate paper by B. Willis, 509
Sonora and Arizona, Sketch-map of part of, to illustrate paper by I. N. Dracopoli, 513; ditto, by C. Lumholtz, 586

ANTARCTIC.

Aurora, Track of, during first year of Australasian Antarctic Expedition under Dr. Mawson, sketch-map, 448

AUSTRALASIA.

New Zealand, illustrating "Some New Zealand Volcanoes": J. M. Bell, 9
Tarawera Volcanic Rift, Topography of, 13
Taupo Volcanic Zone, sketch-map, 11
Tuhua or Mayor Island, Bay of Plenty, Sketch-map: E. C. Goldsmith, 22

GENERAL.

Census Returns, Sketch-maps of France, Austria, and India, 61–68
Globe, Thermal Regions of the, Sketch-maps of: A. J. Herbertson, 519–527

ILLUSTRATIONS AND DIAGRAMS.

EUROPE.

Britain, Bronze Age Settlements—
Beaker found July 2, 1909..187
Flat celt found near Newbury, 185
Gold lunula found near Schulenburg, Hanover, 194
Tyne—
Looking west and east from Bill Quay, 476

ASIA.

Dihong, Native suspension bridge—
Looking down footway from supports, Ponging side, 214
View of bridge from right bank, 215
India, Western—
Galna fort, Interior of rock cistern, 183
Galna fort, North-east angle of, 181
Galna hill, 183
India, Western—*continued.*
Laling fort, Trough of rock cistern on, 181
Japan—
Æsthetic phase of Japanese agriculture. Peasant's farm at 2200 feet, 594
Interculture of barley and beans at 2000 feet, 598

Japan—*continued.*
Interculture of mulberry trees, drying barley and millet, 2000 feet, 599
Mountain valley in paddy-fields at 1750 feet, 594
Mulberry trees and millet, 2000 feet, 599
Pack train passing through a mountain village, 599
Ricefields with boundary ridges planted in beans, 598
Terraced valley, ricefields above Ohara, 2000 feet, 595
Timber roof and weight rocks near upland limit of agriculture, 594
Yumoto, Summer village of, 595
Mesopotamia—
Baghdad, Snow in, 138
Breach in old Hindie barrage on Euphrates, 139
Old Hindie barrage, Falling towers for closing breach, 139
Rahalia oasis, Fresh-water spring, 138
Panjkora Kohistan—
Buddhist tower in Swat, 54
Defile between Darora and Chutiatan, 51
Panjkora Kohistan—*continued.*
Dir, showing approach to Lowarai pass to Chitral, 51
Fort of Khan of Robat, 50
Panjkora river leaving Dir territory, 54
Warai Levy post, 50
Sikkim, Northern—
Avalanche from the Outlier, 247
Chumiumo, Eastern face of, 247
Panorama looking into Tibet from summit arête of Chumiumo (22,430 feet), 245
Panorama of north-east Jonsong glacier, showing Jonsong peak (24,400 feet), 252
Troad—
First Porta, 39
Harbour of Alexandria Troas, 30
Ida from Adramyttium, 39
Ida, Nomad camp and upper limit of pines, 31
Ida, Summit of; Baba from Sari Kiz, 38
Ida, Summit of; Sari Kiz from Baba, 38
Salt-pans of Tuzla, 30
Yuruk village, 31

AFRICA.

Abyssinia, South-Western—
Accretionary pyramid with hot spring issuing from top, 382
Bako river, Natural stone bridge on, 382
Didessa, Grass-covered hill on right bank of, 383
Gibbe falls, 377
Abyssinia, South-Western—*continued.*
Gojeb river, 377
Goré hill, from Abyssinian governor's house, 383
Hawash river, Upper course of, 376
Omo and Gibbe rivers, Meeting-place of, 376

AMERICA.

North America—
Chaco canyon, Ruins in, 396
Cliff dwellings at large ruins of Puyé, 275
Cliff dwellings in Canyon des Los Frinoles, 274
Dunes of pure gypsum near desiccated Lake of Otero, 268
Prehistoric carvings at Puyé, 275
Sequoia gigantea, A stump of, 397
Sequoia gigantea, Young and middle-aged specimens of, 397
Suhuaro or giant cactus, Typical forest of, in Santa Cruz valley, 269
Terraces apparently for cultivation on dry hillside at Trincheras, 269
Tuiyoni Ruins in Canyon de Los Frijoles, 274
North America—*continued.*
Waterless ruin in Santa Cruz basin at Rincon, Site of, 268
Patagonia, Northern—
Cajou Negro, Pass of, with Lago Villarino in foreground, 613
Forest of Argentine Andes, north of Lake Nahuel Huapi, 611
Sonora Desert, Mexico—
Digging for *Ammobroma sonoræ*, 507
Œnothera trichocalyx, 507
Salina del Pinacate, objective point of most of Papago salt expeditions, 506
Santa Catalina mountains, with giant cactus (*Cereus giganteus*) in foreground, 515
Seri Indians, women and children, Tiburon islands, 514
Sierra Blanca, South-eastern end of, 506

AUSTRALASIA.

New Zealand—
Crater of White island, 16
Ngauruhoe, Mount, 16
Ruapehu, Mount, 13
Tarawera mountain, showing great rift, 12
New Zealand—*continued.*
Tauhara, Extinct Volcano of, 12
Waimangu geyser in eruption, 17
White terraces (now destroyed), 17

END OF VOL. XL

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